

**FINAL ENVIRONMENTAL ASSESSMENT**

**Management of Wolf-Livestock Conflicts and  
Control of Depredating Wolves  
in the  
State of Minnesota**

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## SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the Minnesota Department of Natural Resources (MDNR) and in accordance with the Eastern Timber Wolf Recovery Plan proposes to administer and continue the current WS gray wolf (*Canis lupus*) damage management program in the State of Minnesota. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to protect various resources from wolf damage. Wolf damage management work is currently being conducted by WS under a federal permit from the USFWS and a state permit from MDNR. Damage management would be conducted on private or public property in Minnesota when the resource owners (property owners) request assistance to alleviate wolf damage, wolf damage is verified by WS, and an *Agreement for Control* or other comparable document has been completed. The types of wolf damage that WS may be requested to alleviate or prevent includes: 1) depredation on livestock, 2) depredation on pets, and 3) potential threats to human health and safety. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, wolves, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, best management practices (animal husbandry), frightening devices, and livestock guarding animals could be recommended and utilized to reduce wolf damage. In other situations, wolves would be removed as humanely as possible using leg-hold traps, foot snares, neck snares, and shooting. In determining the damage management strategy, preference would be given to non-lethal methods when they are deemed practical and effective. Lethal methods would be used to reduce damage after practical and appropriate non-lethal methods have been considered and determined to be ineffective or inappropriate in reducing damage to acceptable levels. However, non-lethal methods may not always be applied as a first response to each damage problem encountered by WS. The most appropriate initial response to a wolf damage problem could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. All wolf damage management would be conducted in compliance with appropriate federal, state, and local laws and court-mandated restrictions.

## ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BATF	Bureau of Alcohol, Tobacco and Firearms
BMP	Best Management Practices
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBAH	Minnesota Board of Animal Health
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NOA	Notice of Availability
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
UME	University of Minnesota - Extension Service
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

## CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

### 1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (United States Department of Agriculture (USDA) 1997):

*"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."*

Biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animals' health or their environment over an extended period of time (Decker and Purdy 1988). Wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). These terms are especially important in urban areas because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the wildlife acceptance capacity. While the State of Minnesota has a biological carrying capacity to support more than the current number of wolves, the wildlife acceptance capacity is often much lower. Once the wildlife acceptance capacity of a species is reached or exceeded, people will demand implementation of programs, both lethal and non-lethal, to reduce damage or threats of damage.

Wildlife damage management is the science of reducing damage or other problems caused by wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992). Wildlife Services (WS) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105<sup>1</sup>), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may require that the local populations of offending animal(s) be reduced through lethal means.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Animal Damage Control Act of March 2, 1931, as amended 46 Stat. 1486; 7 USC. 426-426c and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 USC 426C)). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

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<sup>1</sup> WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

WS is a cooperatively funded, service-oriented program from which other governmental agencies and entities may request assistance. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999a)

This environmental assessment (EA) documents the potential impacts to the human environment of the proposed Minnesota WS gray wolf (*Canis lupus*) damage management program that would be conducted to reduce damage and achieve a balance between the biological carrying capacity and cultural carrying capacity. This analysis relies mainly on existing data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997) to which this EA is tiered. USDA (1997) may be obtained by contacting the USDA, Animal and Plant Health Inspection Service (APHIS), WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6,000- 6,003, (1995)). WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management that would take place in Minnesota would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be made, consistent with the agency's NEPA procedures, to allow interested parties the opportunity to obtain and review the document and comment on the proposed management program.

## **1.1 WOLF ECOLOGY**

Two species of wolves occur in North America, gray wolves (*Canis lupus*) and red wolves (*Canis rufus*). The common names are misleading since individuals of both species vary in color from grizzled gray to rusty brown to black. Some gray wolves are even white. Adult male gray wolves typically weigh 80 to 120 pounds (36.3 to 54.4 kg) and adult females 70 to 90 pounds (31.8 to 40.8 kg). Although males rarely exceed 120 pound (54.4 kg) and females 100 pounds (45.4 kg) some individuals may weigh much more. The largest subspecies of the gray wolf are found in Alaska and the Northwest Territories of Canada. Gray wolves vary in length from about 4.5 to 6.5 feet (1.4 to 2 m) from nose to tip of tail and stand 26 to 36 inches (66 to 91.4 cm) high at the shoulders (Mech 1970).

During the 1800s, gray wolves ranged over the North American continent as far south as central Mexico. They did not inhabit the southeastern states, extreme western California, or far western Mexico (Young and Goldman 1944). In the late 1800s and early 1900s, wolves were eliminated from most regions of the contiguous 48 United States by control programs that incorporated shooting, trapping, denning, and poisoning.

Current gray wolf habitat in the 48 contiguous United States includes boreal forest and forest/agricultural communities. In Canada and Alaska wolves inhabit forested areas and alpine and arctic tundra.

Mech (1970) reported that gray wolves prey mainly on large animals including white-tailed deer, mule deer, moose, caribou, elk, Dall sheep, bighorn sheep, and beaver. Small mammals and carrion make up the balance of their diet. During the 1800s, wolves on the Great Plains preyed mostly on bison. As bison were eliminated and livestock husbandry established, wolves commonly killed livestock (Young and Goldman 1944).

Gray wolves are highly social, often living in packs of two to eight or more individuals. A pack consists of an adult breeding pair, young of the year, and offspring one or more years old from previous litters that remain with the pack. The pack structure of wolves increases efficiency of wolves in killing large prey (Mech 1970).

Each wolf pack has a home range or territory that it defends against intruding wolves (Mech 1970). Packs maintain their territories by scent marking and howling. On the tundra, packs of wolves may have home ranges approaching 1,200 square miles (3,108 square km). In forested areas, ranges are smaller, encompassing 40 to 120 square miles (104 to 311 square km) (Mech 1970). Some wolves leave their pack and territory and become lone wolves, drifting around until they find a mate and a vacant area in which to start their own pack, or wandering over large areas without settling. Extreme movements, of 180 to 551 miles (290 to 886 km), have been reported (Van Camp and Gluckie 1979, Fritts 1983). These movements were probably of dispersing wolves.

Wild wolves usually are sexually mature at 22 months of age. Breeding usually takes place from early February through March, although it has been reported as early as January and as late as April. Pups are born 60 to 63 days after conception, usually during April or May. Most litters contain 4 to 7 young (Mech 1970).

Courtship is an intimate part of social life in the pack. Mating usually occurs only between the dominant (alpha) male and female of the pack (Mech 1970). Thus, in most cases only 1 litter will be produced by a pack during a breeding season. Some very large packs may occasionally produce more than 1 litter of pups. All pack members aid in rearing the pups. Dominance is established within days after wolf pups are born. As pups mature, they may disperse or maintain close social contact with parents and remain members of the pack.

## **1.2 HISTORICAL WOLF MANAGEMENT**

Because of their perceived threat to livestock, wolves were eliminated from most regions of the contiguous 48 United States during the late 1800s and early 1900s by control programs that incorporated shooting, trapping, denning, and poisoning (Young and Goldman 1944). By the 1930s the range of the wolf had been reduced to approximately 1 percent of its original range with only a remnant population remaining in northern Minnesota.

The ability of wolves to kill cattle, sheep, poultry, and other livestock is well documented (Young and Goldman 1944, Fritts 1982, Carbyn 1983, Fritts et al 1992). Domestic dogs and cats are also occasionally killed and eaten by wolves (Fritts and Paul 1989).

In August 1974, the Endangered Species Act of 1973 (ESA) was invoked to provide legal protection to the remaining wolves in the 48 contiguous United States. Under the protection of the ESA, gray wolf populations have undergone natural recovery in Minnesota, Wisconsin, northern Michigan, and northwestern Montana. Wolves in these states are classified as endangered, except in Minnesota where they are currently listed as threatened. Wolf recovery efforts in each of these states are guided by federal and state wolf management plans. Wolf management in Minnesota is directed by federal rulemaking (USFWS 1978, 43 FR9606 and USFWS 1983, 48 FR36256) and the Eastern Timber Wolf Recovery Plan (Bailey 1978).

In 1995 and 1996, 66 wolves from Alberta and British Columbia, Canada were reintroduced by the U.S. Fish and Wildlife Service into Yellowstone National Park and central Idaho. These wolves were designated as nonessential experimental populations to increase management flexibility and address local and state concerns. The Rocky

Mountain wolf population comprises 3 recovery areas: the northwest Montana recovery area which includes northwest Montana and the northern Idaho panhandle; the Greater Yellowstone recovery area which includes Wyoming and adjacent parts of southeast Idaho and southeast Montana; and the Central Idaho Recovery area which includes central Idaho and adjacent parts of southwest Montana. Wolf restoration is rapidly occurring in Montana, Idaho, and Wyoming. At the end of 2001, there were about 570 wolves in 35 breeding pairs in the three states, making 2001 the second year of the three-year count down toward reaching the recovery goal of having a minimum of 30 breeding pairs, that are equitably distributed throughout Montana, Idaho, and Wyoming for three successive years. The Northern Rocky Mountain Wolf Recovery Plan (USFWS 1980, 1987), Interim Wolf Control Plan for the Northern Rocky Mountains of Montana and Wyoming (USFWS 1988, 1999), and the Final Environmental Impact Statement for the Reintroduction of Wolves to Yellowstone National Park and Central Idaho (USFWS 1994) guide wolf recovery and management efforts in those three states.

### **1.2.1 Wolf damage management in Minnesota**

Minnesota has the largest population of wolves (*Canis lupus*) in the lower 48 contiguous United States and has a long history of wolf control programs (Fritts 1982, Fritts et al. 1992). In August 1974, the Endangered Species Act of 1973 (ESA) was invoked to provide legal protection to wolves in Minnesota. Prior to the ESA, the State had administered various wolf bounty and control programs from 1849 to 1974 (Fritts 1982). Depredation on livestock was one of the reasons cited to justify these programs. After implementation of the ESA, farmers became dependent on the Federal government for protection from wolf depredations on livestock.

Wolf damage control was initiated by the U.S. Fish & Wildlife Service (USFWS) in early 1975. USFWS trappers responded to complaints of wolf-livestock conflicts by live-trapping wolves on or near problem farms. Because of the ESA, the USFWS was prohibited from killing wolves captured at the farms from 1975 through early 1978. As an alternative, Federal personnel tried translocating the wolves into remote areas of northern Minnesota. Altogether, 108 wolves were translocated. Fritts et al. (1984) studied and described movements of these translocated wolves. Their data showed that relocation of livestock-depredating wolves was not an adequate solution to depredation problems. In some instances, trapping was authorized after livestock had been chased by wolves. In other instances, trapping was conducted following sightings of wolves at farms where losses had previously occurred. At times, trapping was conducted over extended periods and for distances of up to 8 km. from some farms. As a result, the USFWS program received considerable criticism from wolf preservationists. Many farmers were also critical of the program claiming that they often had to wait too long before receiving assistance.

The classification of the wolf in Minnesota was changed from "endangered" to "threatened" in April 1978 following recommendations of the Eastern Timber Wolf Recovery Team (Bailey 1978). This change in classification was intended to provide greater protection for farmers and reduce local opposition to wolves while providing ample protection for wolves as required by federal law. This new rulemaking (USFWS 1978, 43 FR 9607) allowed livestock-depredating wolves to be killed by authorized state or federal personnel. Designated employees or agents of the USFWS or the Minnesota Department of Natural Resources were authorized to take wolves without a permit in Minnesota after the wolves committed significant depredations on lawfully present domestic animals, provided that the taking was done in a humane manner. After April 1978, livestock-depredating wolves were no longer relocated.

"Significant depredation" was later defined by the USFWS as "the killing or serious maiming of one or more domestic animals by wolves where the imminent threat of additional domestic animals being killed or severely maimed by wolves is apparent" (memo by L.A. Greenwalt, Director, USFWS, April 12, 1978).

During the summer of 1978, several environmental groups claimed that the USFWS was not following its own regulations. They objected especially to the trapping procedure at a farm 50 km southeast of International Falls where wolves were being taken as far as 8 km from the farm - wolves that in the opinion of the environmentalists probably had not killed cattle at the farm.



The groups filed suit against the USFWS in *Fund for Animals v. Andrus*, Civ. No. 5-78-66, 11 E.R.C. 2189 (D. Minn. 1978). Subsequently, a Federal judge clarified what had already been implied in the Federal regulations by ordering that control trapping and killing of wolves must be done only after a significant depredation occurs and that trapping must, as nearly as possible, be directed toward the capture of the wolf or wolves responsible (Federal Judge P. McNulty court order, July 14, 1978). To reduce the chances of catching non-depredating wolves, the Federal judge restricted trapping to within 0.4 km of the affected farms. Furthermore, killing of pups before September 1 was prohibited because the judge did not consider them depredating animals. To comply as much as possible with the court order, the USFWS required that three specific conditions be met before trapping could be initiated: (1) presence of a wounded animal or some remains of a livestock carcass, (2) evidence that wolves were responsible for the damage, and (3) reason to believe that additional losses would occur if the wolves were not removed.

Meanwhile, a State program was enacted in 1978 to provide compensation to farmers for losses of livestock destroyed by wolves (Minnesota Statutes 1978, Section 3.737). Supporters of this legislation claimed that livestock depredations were proliferating and that farmers were sustaining considerable financial losses. The new law provided compensation of up to \$400 per animal for livestock killed or injured by wolves. The responsibility for verifying claims of wolf depredation and determining the market value of the livestock was given to the local Minnesota Department of Natural Resources (MDNR) conservation officer and the University of Minnesota Agricultural Extension Service's county extension agent, respectively. In 1998, the amount of compensation provided per animal was increased from \$400 to \$750. This program is still in effect with total annual payments for wolf damage ranging from \$43,580 to \$84,345 during 1996-2000.

On July 14, 1982, the USFWS proposed to amend the special regulations governing the wolf in Minnesota (USFWS 1982, 47 FR 30528). The wolf is listed under the Endangered Species Act, 16 U.S.C. 1533, as threatened in Minnesota and endangered elsewhere in the 48 contiguous United States (50 CFR 17.11). The USFWS proposed to allow a carefully controlled taking of wolves by the public and by designated State and Federal employees in certain areas of the State. The proposed amendment was in response to efforts by the MDNR to have management of the wolf returned to the State. The MDNR had developed a management plan for the wolf in 1980 (Minnesota Timber Wolf Management Plan, 1980). The plan was later modified to become the Minnesota Timber Wolf Management Plan, 1982.

The proposed amendment would have authorized the sale in interstate and foreign commerce of wolf parts taken by the public. In addition, the amendment would modify the FWS's existing wolf depredation control program by authorizing the taking of wolves within one-half mile of farms where depredation has occurred and by authorizing the killing of any wolf, including pups of the year. The final rule was published in the Federal Register (USFWS 1983, 48 FR 36256) on August 10, 1983.

Several environmentalist groups challenged this rulemaking, filing suit in *Sierra Club and Defenders of Wildlife v. Clark*. The groups alleged, among other things, that the USFWS could not authorize public taking of the threatened wolf without demonstrating that the taking was required to relieve population pressures among the wolves and that USFWS had not explained its reasons for altering the existing program for controlling wolves that prey on domestic animals. The USFWS agreed with the plaintiffs to stay the effectiveness of the rule pending the outcome of the lawsuit. On January 5, 1984, the District Court of Minnesota granted the plaintiffs' motion for summary judgement, *Sierra Club and Defenders of Wildlife v. Clark*, 577F. Supp. 783 (D. Minn. 1984), a ruling that was appealed by USFWS. On February 19, 1985, the United States Court of Appeals for the Eighth Circuit affirmed the District Court's decision on public taking of the wolf but remanded for further consideration by the District Court the issue of whether the changes in depredation control had been adequately explained, *Sierra Club and Defenders of Wildlife v. Clark*, 755 F. 2d 608 (8th Cir. 1985).

After a hearing on May 2, 1985, upon the consent of the parties, the District Court ordered the USFWS to amend the August 10, 1983, regulations to:

1. Require, with regard to the depredation control program, that (1) any taking or killing of wolves must occur within one-half mile of the place where such depredation occurred and must be performed in a humane manner and (2) any young of the year taken on or before August 1 of that year be released.

2. Prohibit sale or export in interstate or international commerce of Minnesota wolves.

The USFWS issued a revised final rule (USFWS 1985, 50 FR 50792) identical to the final rule issued on August 10, 1983, (USFWS 1983, 48 FR 36256), with the exceptions that were required by orders of the United States District Court for the Minnesota District on January 5, 1984, and May 2, 1985.

An environmental assessment (EA) was prepared by the USFWS in conjunction with the August 10, 1983 final rule, and the USFWS determined that the adoption of that rule was not a major Federal action that would require an environmental impact statement. The USFWS, likewise, concluded that adoption of the revised final rule (USFWS 1985, 50 FR 50792) was also not a major Federal action of significant impact.

A wolf depredation control program was operated by the USFWS from 1975 through March 1986. The program was transferred to ADC (WS) in March 1986. All USFWS regulations for taking wolves in Minnesota that are listed in 50 CFR 17.40 (d), and additional Federal court-mandated restrictions remain binding on Minnesota WS personnel while conducting wolf depredation control activities. All decisions supported by the USFWS EA were also adopted by WS. Minnesota WS personnel are issued a permit (Federal Endangered Species Permit PRT-697830) each year by the USFWS Region 3 Office under authority of 50 CFR 17.32 for such activities.

### **1.3 WOLF ACTIVITY IMPACTS TO THE ENVIRONMENT AND SOCIETY ATTITUDES**

#### **1.3.1 Benefits of Wolf Activities**

Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

Wildlife populations also provide a range of direct and indirect social and economic benefits (Decker and Goff 1987). Direct benefits are derived from a user's personal relationship or direct contact with wildlife and may include both consumptive (e.g., using or intending to use the animal such as in hunting or fishing) or nonconsumptive use (e.g., observing or photographing animals) (Decker and Goff 1987). Indirect benefits, or indirect exercised values, arise without a human being in direct contact with an animal and are derived from experiences such as looking at pictures or videos of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Two forms of indirect benefits exist according to Decker and Goff (1987): bequest and pure existence. Bequest benefits arise from the belief that wildlife should exist for future generations to enjoy; pure existence benefits accrue from the knowledge that the animals exist in the human environment (Decker and Goff 1987) or that they contribute to the stability of natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987).

Wolves may also play an important role in predator/prey relationships. By culling old, young, sick, and injured individuals from a prey population, it is believed that wolves help to maintain healthy, viable prey populations when other prey population mortality factors are in balance (Mech 1970).

Viewing wolves or getting them to howl in their natural habitat is a popular activity in certain areas and is considered to add value to many people's outdoor experience. Organized tours for the purpose of viewing wolves or hearing them howl are conducted at some U.S. and Canadian national parks such as Yellowstone National Park (WY), Denali National Park (AK), Wood Buffalo National Park (Alberta, Canada), and Riding Mountain National Park (Alberta, Canada). Small or large group howling attempts can also be made in any areas where wolves are

known to be present. Such activities provide not only aesthetic viewing but there may also be associated economic (tourism) benefits.

### **1.3.2 Damage from Wolf Activities**

The ability of wolves to kill cattle, sheep, poultry, and other livestock is well documented (Young and Goldman 1944, Fritts 1982, Carbyn 1983, Fritts et al. 1992, Paul unpublished data, 1975-2001). Domestic dogs and cats are also occasionally killed and eaten by wolves (Fritts and Paul 1989).

The economic impact of wolf depredation on livestock can be substantial for individual producers and in total. During 1996-2000, the Minnesota Department of Agriculture made annual payments for wolf damage ranging from \$43,580 to \$84,345. Over \$821,517 has been paid for wolf damage in Minnesota since a wolf compensation program was enacted in 1978. This amount represents a minimum figure as Minnesota livestock producers are only paid for verified losses, they are not paid for any "missing" livestock potentially killed by wolves, and the maximum payment per animal has sometimes not fully reimbursed producers for the market value of the livestock killed.

When wolves come into people's yards and kill or injure their pets there is both an economic and an emotional loss. There is the cost to replace a dog that has been killed or to care for one that has been injured. Also, many people are attached emotionally to their pets and have very strong feelings concerning their loss.

Wolves can also negatively impact other wildlife species, especially wolf prey species. Where wolves are the dominant predator on an ungulate species (deer, moose, elk, and etc.) and prey numbers are below carrying capacity, a significant reduction in wolf numbers can produce increases in the number of ungulate prey (Gasaway et al. 1983, Gauthier and Theberge 1987). Deer, moose, elk, and other ungulates have great economic and aesthetic value and therefore wolf control can sometimes be economically justified. When wolf control programs are terminated, wolves may rapidly recover through immigration and reproduction (Ballard et al. 1987). Wolf control conducted to enhance or recover ungulate populations must be considered as an acceptable management option, although highly controversial (Mech 1985).

### **1.3.3 Public Health and Safety Risks from Wolf Damage**

When wolves come near residences and threaten or kill people's pets or exhibit bold behavior, people often become concerned for human safety. This is especially true if small children are present at those residences. This concern is often reinforced by the fact that when wolves come into yards, especially after dogs, the wolves may seem reluctant to leave, even when they are harassed by humans. This often leaves people with the impression that there is something wrong with the wolf, that it is diseased or debilitated, and therefore a threat. Wild wolves rarely contract rabies, but it is a possibility, and a concern for humans or their pets should they be bitten. Wolves could also spread other wildlife diseases to dogs (such as sarcoptic mange) should they have contact with a dog or their environment.

In recent years, there have been three documented instances in Canada and Alaska where wild wolves became habituated to humans (bold), because they were fed by humans in a campground type situation, where they subsequently attacked and injured people. There are no verified instances of wolves having attacked and injured people in the lower 48 United States.

## **1.4 SCOPE AND PURPOSE OF THIS EA**

The scope and purpose of this EA is to evaluate the potential impact from WS wolf damage management to protect agriculture, property, and public health and safety in Minnesota. Damage problems can occur throughout the State, resulting in requests for WS assistance. Under the Proposed Action, wolf damage management could be conducted on private, federal, state, tribal, county, and municipal lands in Minnesota. In the most recent five year period, Fiscal Year (FY) 1996 to FY 2000, WS had 75, 100, 110, 92, and 91 *Agreements for Control* to conduct wolf damage management in each year respectively (MIS 1996-2000). Minnesota encompasses about 54,611,840 acres.

WS anticipates that the proposed action would occur only at individual damage sites (properties) of 1-2,500 acres distributed across no more than 60% of the land in Minnesota and no more than 150-300 wolves would be removed by WS annually. This estimate is based upon past *Agreements for Control* (MIS 1996-2000) and anticipated increase in future WS wolf control activities.

## **1.5 NEED FOR WOLF DAMAGE MANAGEMENT IN MINNESOTA**

Under the legal protection of the ESA of 1973, Minnesota's wolf population has grown and its range expanded. During the early 1970's there were about 750 wolves in the state. By 1998, the population had increased to an estimated 2,500 wolves (Fuller et al. 1992, Berg and Benson 1999). The population is expanding at the rate of about 5 percent per year, and soon wolves will have colonized nearly all of the potential wolf range in Minnesota (Fuller et al. 1992). The current population estimate is well above the Eastern Timber Wolf Recovery Plan goal of 1,250-1,400 wolves by the year 2000. The MDNR has asked the USFWS to delist the wolf in Minnesota because the population is now considered recovered in the State. The delisting process could begin as early as 2003.

As Minnesota's wolf population recovered, wolf-livestock conflicts slowly increased each year (Fritts 1982, Fritts et al. 1992, Mech 1998, Paul unpublished data - Appendix D). Currently, WS conducts control activities at 70-100 farms annually that suffer verified wolf depredations and removes between 150-225 wolves each year. The expansion of wolves into more agricultural areas in Minnesota has led to an increase in depredation problems (Appendix D) and an expansion of WS wolf control activities. This trend is expected to continue and the number of wolves that need to be taken annually to resolve wolf-livestock conflicts is also likely to increase (Mech 1998). The current WS wolf damage management program serves as an important buffer between livestock depredations and an expanding wolf population. It also helps to facilitate wolf recovery in the state by reducing the level of controversy that usually surrounds wolf management policies.

Domestic dogs and cats are also occasionally killed and eaten by wolves in Minnesota (Fritts and Paul 1989). During 1996-2000, WS verified that wolves killed 80 dogs and wounded another 38 at residences scattered across the wolf range. There are probably other instances where wolves attack dogs, but the incident is not reported or the dog turns up missing. Wolves may carry off the carcass of a small dog or drag a dog's carcass out of the yard and into the woods. Many attacks by wolves on dogs occur in the resident's yard and often are witnessed by people. Such attacks raise serious concerns by people about both pet and human safety. WS removal of problem wolves that attack dogs helps to mitigate those concerns.

## **1.6 PROPOSED ACTION**

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the Minnesota Department of Natural Resources (MDNR) and in accordance with the Eastern Timber Wolf Recovery Plan proposes to administer and continue the current WS gray wolf (*Canis lupus*) damage management program in the State of Minnesota. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to protect various resources from wolf damage. Wolf damage management work is currently being conducted by WS under a federal permit from the USFWS and a state permit from MDNR. Damage management would be conducted on private or public property in Minnesota when the resource owners (property owners) request assistance to alleviate wolf damage, wolf damage is verified by WS, and an *Agreement for Control* or other comparable document has been completed. The types of wolf damage that WS may be requested to alleviate or prevent includes: 1) depredation on livestock, 2) depredation on pets, and 3) potential threats to human health and safety. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, wolves, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, best management practices (animal husbandry), frightening devices, and livestock guarding animals could be recommended and utilized to reduce wolf damage. In other situations, wolves would be removed as

humanely as possible using leg-hold traps, foot snares, neck snares, and shooting. In determining the damage management strategy, preference would be given to non-lethal methods when they are deemed practical and effective. Lethal methods would be used to reduce damage after practical and appropriate non-lethal methods have been considered and determined to be ineffective or inappropriate in reducing damage to acceptable levels. However, non-lethal methods may not always be applied as a first response to each damage problem encountered by WS. The most appropriate initial response to a wolf damage problem could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. All wolf damage management would be conducted in compliance with appropriate federal, state, and local laws and court-mandated restrictions.

#### **1.7 OBJECTIVES FOR THE MINNESOTA WS WOLF DAMAGE MANAGEMENT PROGRAM**

- 1.7.1** Attempt to balance the needs of the wolf as a dynamic part of the ecosystem and a federally threatened species, with the need to minimize damage to human interests.
- 1.7.2** Respond to all wolf damage problems within 24-48 hours.
- 1.7.3** Keep the take of non-target species as low as possible during wolf damage management operations.

#### **1.8 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS**

**1.8.1 ADC Programmatic EIS.** WS has issued a final EIS (USDA 1997) and Record of Decision on the National APHIS-WS program. This EA is tiered to that EIS.

**1.8.2 USFWS Environmental Assessment.** On July 14, 1982, the USFWS proposed to amend the special regulations governing wolf management in Minnesota (USFWS 1982, 47 FR 30528). The final rule was published in the Federal Register (USFWS 1983, 48 FR 36256) on August 10, 1983. An environmental assessment (EA) was prepared by the USFWS in conjunction with the August 10, 1983 final rule, and the USFWS determined that the adoption of that rule was not a major Federal action that would require an environmental impact statement. The USFWS issued a revised final rule (USFWS 1985, 50 FR 50792) identical to the final rule issued on August 10, 1983, (USFWS 1983, 48 FR 36256), with the exceptions that were required by orders of the United States District Court for the Minnesota District on January 5, 1984, and May 2, 1985. The USFWS, likewise, concluded that adoption of the revised final rule (USFWS 1985, 50 FR 50792) was also not a major Federal action of significant impact. Pertinent information from this USFWS EA is incorporated into this EA by reference.

**1.8.3 1992 USFWS Eastern Timber Wolf Recovery Plan.** This plan outlines management strategies and population goals for recovery of Minnesota's wolf population. It defined five wolf management zones for the state and provided recommendations for wolf depredation control. WS follows the depredation management guidelines and zone concepts as outlined in the plan. Pertinent information from this recovery plan is incorporated into this EA by reference.

#### **1.9 DECISION TO BE MADE**

Based on the scope of this EA, the decisions to be made are:

- Should the integrated wolf damage management program, as currently implemented by WS, be continued in Minnesota?

- If not, should WS attempt to implement one of the alternatives to an IWDM strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment requiring preparation of an EIS?

## **1.10 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS**

**1.10.1 Actions Analyzed.** This EA evaluates wolf damage management to protect agricultural, property, and public health and safety in Minnesota.

**1.10.2 American Indian Lands and Tribes.** Currently WS does not have any MOUs or signed agreements with any American Indian tribe in Minnesota for wolf damage management. If WS enters into an agreement with a tribe for wolf damage management, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA.

**1.10.3 Period for which this EA is Valid.** This EA would remain valid until Minnesota WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

**1.10.4 Site Specificity.** This EA analyzes the potential impacts of wolf damage management and addresses activities on all public and private lands in Minnesota under MOU, Cooperative Agreement, and in cooperation with the appropriate public land management agencies. It also addresses the impacts of wolf damage management on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever wolf damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in Minnesota (see Chapter 3 for a description of the Decision Model and its application).

**1.10.5 Public Involvement/Notification.** As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

## **1.11 PREVIEW OF THE REMAINDER OF THIS EA**

The remainder of this EA is composed of four (4) chapters and six (6) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation and standard operating procedures (SOP). Chapter 4 analyzes consistency with environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA. Appendix A is the literature cited used during the preparation of the EA, Appendix B is the authorities for conducting wildlife damage management in Minnesota, Appendix C is a detailed description of the methods used for wolf damage management, Appendix D contains Minnesota wolf

depredation control program data, Appendix E are USFWS wolf management regulations and WS wolf damage management permits, and Appendix F contains selected portions of the Eastern Timber Wolf Recovery Plan pertinent to this EA.

## **CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT**

### **2.0 INTRODUCTION**

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter in the discussion of issues used to develop mitigation. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the current program in Chapter 3.

### **2.1 AFFECTED ENVIRONMENT**

The areas of the proposed action could include any property, public or private, where gray wolf damage is occurring in the state and a request for assistance is made.

### **2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4**

The following are issues that have been identified as areas of concern requiring consideration in this EA and were used to develop mitigation measures:

- Effects on wolf populations
- Effects on non-target species populations, including T&E species
- Effects on public and pet health and safety
- Humaneness of methods to be used
- Impacts to stakeholders, including aesthetics of wildlife

#### **2.2.1 Effects on wolf populations.**

The federally protected gray wolf (*Canis lupus*) which currently has a "threatened" status in Minnesota is targeted by the proposed action. Some persons may be concerned that WS wolf damage management activities would result in the loss of local populations of wolves or have a cumulative adverse effect on the viability of Minnesota's wolf population. Wolf dispersal from Minnesota into Wisconsin has also aided in the recolonization and recovery of wolves in that state; therefore, wolf damage management in Minnesota could also impact on Wisconsin's wolf population.

#### **Wolf Population Impact Analysis.**

Gray wolves are highly social, often living in packs of two to eight or more individuals. A pack consists of an adult breeding pair, young of the year, and offspring one or more years old from previous litters that remain with the pack. Each wolf pack has a home range or territory that it defends against intruding wolves. In forested areas such as Minnesota, territories may encompass 40 to 120 square miles (104 to 311 square km) (Mech 1970). Wolves expand their range in Minnesota through natural dispersal from established packs. Dispersing wolves meet, pair up, and establish new territories in areas not already occupied by wolves or where vacant territories exist.

As a federally protected species with a "threatened" status in Minnesota, Minnesota's wolves are under federal management until such time as recovery criteria are met for federal delisting and management is returned to the state. The USFWS, guided by the Eastern Timber Wolf Recovery Plan (FWS 1992), is responsible for wolf recovery and management in Minnesota. The plan supports the lethal taking of depredating wolves and sets wolf population density limits for Wolf Management Zones 4 and 5 (see map in Appendix F).



Federal regulations for the gray wolf (50 CFR 17.40 (d)) and the revised Eastern Timber Wolf Recovery Plan (USFWS 1992) support the lethal taking of wolves that depredate on domestic animals. The Eastern Timber Wolf Recovery Plan established a recovery goal for the Minnesota wolf population of 1,250-1,400 wolves by the year 2000. The plan also set wolf population density limits for Wolf Management Zone 4 of 1 wolf per 50 square miles and for Zone 5 of "no" wolves (Appendix F). Much of the range expansion by wolves in recent years has occurred in Zones 4 and 5 where population densities are considerably higher than those recommended in the plan (Berg and Benson 1999).

The authority for management of resident wildlife species is the responsibility of the MDNR and wolves are classified as a species of special concern (protected). MDNR compiles and provides information to WS on wolf population numbers and trends (Fuller et al. 1992, Berg and Benson 1999) and uses this information to develop a potential management plan for the state's wolf population once delisting occurs. Therefore, WS uses the best information available for periodic estimates of the number of wolves in Minnesota and their range across the state.

Minnesota's wolf population is considered part of the Western Great Lakes Distinct Population Segment which includes MN, WI, MI, and the Dakotas. In 1998, Minnesota's gray wolf population was estimated at 2,500 wolves with an annual growth rate of 5 percent in spite of illegal killing and WS depredation control (Berg and Benson 1999). Currently, there are an estimated 2,600 wolves in Minnesota, 250 in Wisconsin, and 250 in Michigan. At the present time, Minnesota's wolf population has met all the criteria outlined in the Eastern Timber Wolf Recovery Plan for federal delisting. Those criteria included a wolf population recovery goal of 1,250-1,400 wolves in Minnesota by the year 2000 and a combined population of at least 100 wolves in Wisconsin and Michigan for five consecutive years.

At the present time, the number of wolves taken (killed) annually by Minnesota WS personnel is biologically insignificant concerning the viability of Minnesota's wolf population. During FY96, FY97, FY98, FY99, and FY00, 134, 212, 166, 157, and 150 wolves were taken (killed) annually or 6.1, 9.2, 6.9, 6.3, and 5.8 as percentage take of the estimated population (Table 2-1). Wolf biologists and managers generally agree that healthy, productive wolf populations can sustain annual harvests of 28-53 % without permanently reducing their numbers (Mech 1970, 2001, Peterson et al. 1984, Fuller 1989, Ballard et al. 1987, 1997). Moreover, WS wolf damage management activities are localized in nature, occurring only at those sites where wolf damage has been verified. It is concluded that WS cumulative impacts on the statewide gray wolf population is insignificant in regards to the potential annual sustainable harvest level.

Table 2-1. WS take of wolves during depredation control activities in Minnesota FY96-00 and cumulative take as % of population.

	WS Take	Public Take (Fur Harvest and other Depredation Take)	Total Take	Estimated Population	Cumulative Take as % of Population	Sustainable Harvest Level
<b>Species</b>						
Wolf						
1996	134	T/E Species	134	2,200	6.1	28-53%
1997	212	T/E Species	212	2,300	9.2	28-53%
1998	166	T/E Species	166	2,400	6.9	28-53%
1999	157	T/E Species	157	2,500	6.3	28-53%
2000	150	T/E Species	150	2,600	5.8	28-53%

### **2.2.2 Effects on non-target species populations, including T&E species.**

A common concern among members of the public and wildlife professionals, including WS personnel, is that the proposed action or any of the alternatives would result in removing individuals or adversely impact populations of native wildlife species, particularly T&E species. Special efforts are made to avoid jeopardizing Threatened and Endangered species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the Endangered Species Act (ESA) concerning potential impacts of wolf damage management methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997, Appendix F). WS's standard operating procedures include measures intended to mitigate or reduce the effects on non-target species populations and are described in other sections of this EA. Currently, there are 4 federally listed animal and bird T&E species and 28 state listed animal and bird T&E species in Minnesota. WS's mitigation and SOPs that are designed to reduce the adverse effects on non-target species and to avoid jeopardizing T&E species' populations are presented in Chapter 3.

All USFWS regulations for taking wolves in Minnesota that are listed in 50 CFR 17.40 (d), and additional Federal court-mandated restrictions remain binding on Minnesota WS personnel while conducting wolf depredation control activities. All decisions supported by the USFWS EA were also adopted by WS. Minnesota WS personnel are issued a permit (Federal Endangered Species Permit PRT-697830) each year by the USFWS Region 3 Office under authority of 50 CFR 17.32 for such activities.

The USFWS has concurred with WS that wolf damage management activities would have no adverse effect on federally listed animal and bird T&E species in Minnesota (Dan Stinnett, USFWS, letter to B. Paul, WS, February 12, 2002).

The Minnesota DNR has indicated that WS wolf damage management activities would have no adverse effect on state listed animal and bird T&E species (B. Eliason, MDNR, letter to B. Paul, WS, February 22, 2002).

### **2.2.3 Effects on public safety and pet health and safety.**

A common concern is whether the proposed action or any of the alternatives pose an increased threat to public and pet health and safety. In particular, there is concern that the lethal methods of wolf removal (i.e., trapping, snaring, and shooting) may be hazardous to people and pets, or that continued increases in wolf populations might threaten public and pet health or safety.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and firearms misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who use firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

### **2.2.4 Humaneness of methods to be used.**

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but complex concept. Kellert and Berry (1980) in a survey of American attitudes toward animals related that 58% of their respondents, "*... care more about the suffering of individual animals ... than they do about species population levels.*" Schmidt (1989) indicated that vertebrate pest control for societal benefits could be

compatible with animal welfare concerns, if "... *the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

Suffering has been described as a "... *highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "... *can occur without pain ...*," and "... *pain can occur without suffering ...*" (American Veterinary Medical Association (AVMA) 1986). Because suffering carries with it the implication of a time frame, a case could be made for "... *little or no suffering where death comes immediately ...*" (California Department of Fish and Game (CDFG) 1991), such as the WS technique of shooting.

Defining pain as a component of humaneness may be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... *probably be causes for pain in other animals ...*" (AVMA 1986). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991). Some WS damage management methods such as leg-hold traps and body snares, may thus cause varying degrees of pain in different animal species for varying time frames. At what point pain diminishes or stops under these types of restraint has not been measured by the scientific community.

Pain and suffering as it relates to a review of WS damage management methods to capture animals, has both a professional and lay point of arbitration. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since "... *neither medical or veterinary curricula explicitly address suffering or its relief*" (CDFG 1991).

Research suggests that with some methods, such as restraint in leg-hold traps, changes in the blood chemistry of trapped animals indicate "*stress*" (USDA 1997: 3-81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of humans if damage management methods were not used. Therefore, humaneness appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of suffering with the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management devices through research and is striving to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in those situations when non-lethal damage management methods are not practical or effective.

Minnesota WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology and funding. Mitigation /SOPs used to maximize humaneness are listed in Chapter 3. As appropriate, WS euthanizes live animals by methods recommended by the AVMA (Beaver et al. 2001) or the recommendations of a veterinarian, even though the AVMA euthanasia methods were developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife.

#### **2.2.5 Impacts to stakeholders, including aesthetics of wildlife.**

The human attraction to animals has been well documented throughout history, an idea supported by prehistoric cave paintings and the domestication of wild animals. Today's American public is no exception, as evidenced by the large percentage of households that have pets or observe wildlife. Some

people also may consider individual wild mammals and birds as "pets" and exhibit affection toward these animals. They may also want to have more wild animals in their immediate environment. Some humans also claim that they have a spiritual bond with wild animals. Conversely, some people have no emotional attachment to wildlife; some may even fear the presence of wild animals in their vicinity and demand their immediate removal. Consequently, public opinion about the best ways to manage conflicts between humans and wildlife is highly variable, making the implementation and conduct of wildlife damage management programs extremely complex. Ideas about how these programs are implemented and conducted are as unique as the almost infinite combinations of philosophies, psyches, aesthetic values, personal attitudes, and opinions found in humans. These differences of opinion result in concerns that the proposed action or the alternatives would result in the loss of aesthetic benefits to the general public and resource owners.

Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

Wildlife populations also provide a range of direct and indirect social and economic benefits (Decker and Goff 1987). Direct benefits are derived from a user's personal relationship or direct contact with wildlife and may include both consumptive (e.g., using or intending to use the animal such as in hunting or fishing) or nonconsumptive use (e.g., observing or photographing animals) (Decker and Goff 1987). Indirect benefits, or indirect exercised values, arise without a human being in direct contact with an animal and are derived from experiences such as looking at pictures or videos of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Two forms of indirect benefits exist according to Decker and Goff (1987): bequest and pure existence. Bequest benefits arise from the belief that wildlife should exist for future generations to enjoy; pure existence benefits accrue from the knowledge that the animals exist in the human environment (Decker and Goff 1987) or that they contribute to the stability of natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987).

People directly affected by problems caused by wolves often insist on their removal from where the conflict occurs. Others have the view that all wildlife involved in conflicts should be captured and relocated to another area to alleviate the problem. Individuals not directly affected by a reported conflict may be supportive of affected humans, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those who oppose removal of wildlife may do so because of emotional ties to the animals, which are similar to the bonds that may exist between a human and a pet. Some may totally oppose wolf damage management, especially if lethal methods are used, and want WS to teach tolerance of wolves causing conflicts.

IWDM provides relief from damage or threats of damage to people who would have no recourse if other damage management methods are ineffective or impractical. Minnesota WS only conducts wolf damage management at the request of the affected home/property owner or resource manager. When requests for wolf damage management assistance are received, WS addresses the issues/concerns, develops an appropriate plan of action, and explains the reasons for selecting the action that is implemented. Management actions are then carried out in a dedicated, humane and professional manner.

The public's ability to view wolves in a particular area would be more limited if wolves are removed or translocated. However, dispersal in the fall and late winter from other areas could possibly replace wolves removed if adequate prey and habitat are available and the opportunity to view or hear wolves is available where adequate habitat exists. In addition, wolves are usually difficult to observe because of their secretive and nocturnal behavior.

## **2.3 ADDITIONAL ISSUES USED TO DEVELOP MITIGATION MEASURES**

### **2.3.1 Cultural, Economic, and Social Issues.**

The National Historic Preservation Act of 1966, as amended, requires federal agencies to evaluate the effects of any federal undertaking on cultural resources and to consult with appropriate American Indian Tribes to determine whether they have concerns for cultural properties in areas of these federal undertakings. The Native American Graves and Repatriation Act of 1990 provides for protection of American Indian burial sites, human remains, funerary objects and sacred objects, and establishes procedures for notifying Tribes of any new discoveries.

In most cases, wolf damage management has little potential to cause adverse effects to sensitive cultural resources. The site areas where damage management would be conducted are small and pose minimal ground disturbance. The Minnesota Historic Preservation Office (MHPO) has reviewed the program as proposed and concluded "no properties for or listed on the national Register of Historic Places will be affected by this project" (D. Gimmestad, MHPO, letter to B. Paul, WS, February 22, 2002).

In consideration of American Indian cultural and archeological interests, the Minnesota WS program provided a Notice of Availability (NOA) of this EA to all the tribes in Minnesota. This includes four Dakota communities (Prairie Island Mdewakanton Sioux Community, Shakopee-Mdewakanton Sioux Community, Lower Sioux Community, Upper Sioux Community) and seven Anishinaabe reservations (Bois Forte, Fond du Lac, Grand Portage, Leech Lake, Mille Lacs, White Earth and Red Lake).

### **2.3.2 Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"**

Environmental Justice (EJ) has been defined as the pursuit of equal justice protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Fair treatment implies that no person or group should endure a disproportionate share of the negative environmental impacts resulting from this country's domestic and foreign policies or programs. Executive Order 12898 requires federal agencies to make EJ part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS plans to implement Executive Order 12898 principally through the provisions of NEPA.

WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, WS wolf damage management may provide for a safer environment for minority or low-income persons by reducing public health and safety risks.

### **2.3.3 Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).**

Children may suffer disproportionately from environmental health and safety risks for many reasons, including those related to their physical and mental development. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed gray wolf damage management would use only legally available and approved methods that are highly unlikely to adversely affect children. Additionally, WS provides verbal and written warnings to prevent harming humans. For these reasons, WS concludes that it would not create an environmental health or safety risk to children.

from implementing this proposed action. In contrast, WS wolf damage management may provide for a safer environment for children by reducing public health and safety risks.

## **2.4 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE**

### **2.4.1 WS's Impact on Minnesota's Biodiversity.**

No Minnesota WS activity is conducted to eradicate any wildlife species or population. WS operates according to international, federal, and state laws and regulations enacted to ensure species viability. In addition, any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. The impacts of the current WS program on biodiversity are minor and not significant nationwide, statewide, or regionwide (USDA 1997). WS operates on a relatively small percentage of the land area of the State (see Section 1.4), and the WS take of any wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the population (see Section 4.3).

### **2.4.2 Public Concern About the Use of Chemicals.**

Much of the public concern over the use of pesticides for wildlife damage management is based on an erroneous perception that WS uses excessive quantities of non-selective, outdated chemicals. To the contrary, WS uses an IWDM approach to managing wildlife damage, which often does not employ chemicals as a damage management tool. Chemicals used by WS are registered with both EPA and WDATCP and used in accordance with Federal and State law and label restrictions. WS Directives and MOU's with cooperators also regulate the use of chemical damage management tools by WS personnel. Social and legal concerns and selectivity of available methods are also considered in the WS decision-making process before chemicals are used on any damage management project. In a Risk Assessment of the WS program (USDA 1997, Appendix P), APHIS has determined that, when used according to label directions, chemical damage management tools are selective for target species and have negligible impacts. No toxicants are currently registered for wolf damage management in Minnesota.

### **2.4.3 Wolf Damage Should be Managed by Hunters and Trappers.**

WS provides professional wildlife damage management services at site-specific locations when requested by citizens experiencing a wildlife/human conflict. Personnel respond to requests for assistance in accordance with the Congressional direction provided to WS that authorizes the program. Because wolves are federally protected, only WS, USFWS, or MDNR personnel are authorized and permitted to conduct wolf damage management in Minnesota at the present time. Should the wolf be delisted in Minnesota and a harvest by hunters and trappers allowed, it would be based more on a desire to sport hunt. Most sport trappers and hunters cannot afford to provide timely, long-term, site-specific wolf damage management services to a complainant, who often requires the type of commitment WS could provide.

### **2.4.4 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.**

Some individuals might question whether preparing an EA for an area as large as the State of Minnesota would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire state may provide a better analysis than multiple EA's covering smaller zones. In addition, Minnesota WS only conducts wolf damage management in a very small area of the state where damage is occurring or likely to occur (see Section 1.4) and damage may occur anywhere in the State (see Section 1.10.5).

## CHAPTER 3: ALTERNATIVES

### 3.0 INTRODUCTION

This chapter consists of seven parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action, 3) wolf damage management approaches used by WS, 4) wolf damage methods authorized for use or recommended, 5) methodologies recommended but deemed impractical, ineffective, or unsafe at the present time, 6) a description of alternatives considered, but eliminated from detailed analysis, and 7) a table of mitigation measures and SOP's. Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), "*Methods of Control*" (USDA 1997 Appendix J) and the "*Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program*" (USDA 1997, Appendix P) of USDA (1997). Five alternatives were recognized, developed, and analyzed in detail; three alternatives were considered but not analyzed in detail with supporting rationale. The five alternatives analyzed in detail are:

- Alternative 1 - No WS Wolf Damage Management in Minnesota. This alternative would result in no assistance from WS in reducing wolf damage in Minnesota. WS would not provide technical assistance or operational damage management services.
- Alternative 2 - Only Lethal Wolf Damage Management. Under this alternative, only lethal operational damage management and technical assistance would be provided by WS.
- Alternative 3 - Integrated Wolf Damage Management for all Private and Public Land (No Action/Proposed Action). This alternative is the current MN WS wolf damage management program and is the proposed action. Under this alternative lethal and non-lethal operational damage management and technical assistance would be provided by WS.
- Alternative 4 - Technical Assistance Only (Preventive Measures or Best Management Practices). Under this alternative, WS would not conduct operational wolf damage management in Minnesota. The entire program would consist of technical assistance.
- Alternative 5 - Non-lethal Wolf Damage Management. Under this alternative, only non-lethal operational damage management and technical assistance would be provided.

### 3.1 ALTERNATIVES CONSIDERED, INCLUDING THE PROPOSED ACTION

#### 3.1.1 Alternative 1 - No WS Wolf Damage Management in Minnesota.

This alternative would result in no assistance from WS in reducing wolf damage in Minnesota. WS would not provide technical assistance or operational damage management services. All requests for wolf damage management would be referred to the USFWS or MDNR as only authorized federal or state personnel could conduct wolf control activities. Assistance may or may not be available from either of these agencies who currently do not participate in wolf damage management.

#### 3.1.2 Alternative 2 - Only Lethal Wolf Damage Management

Under this alternative, only lethal operational wolf damage management would be provided by WS. Requests for information regarding non-lethal management approaches would be referred to USFWS, MDNR, other state agencies, or private businesses or organizations. Individuals or agencies might choose WS for lethal damage management services, implement non-lethal methods or other methods not recommended by WS, or take no action.

### **3.1.3 Alternative 3 - Integrated Wolf Damage Management for all Private and Public Land (No Action and Proposed Action).**

Wildlife Services proposes to administer and continue the current wolf damage management program in the State of Minnesota. An IWDM approach would be implemented to reduce damage associated with wolf activities to property, agricultural, and public health and safety on all lands in Minnesota where a need exists and a request is received. Damage management would be conducted on property in Minnesota when the resource owners (property owners) or managers request assistance to alleviate wolf damage. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, wolves, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, best management practices (animal husbandry), frightening devices, and livestock guarding animals could be recommended and utilized to reduce wolf damage. In other situations, wolves would be removed as humanely as possible using leg-hold traps, foot snares, neck snares, and shooting. In determining the damage management strategy, preference would be given to non-lethal methods when they are deemed practical and effective. Lethal methods would be used to reduce damage after practical and appropriate non-lethal methods have been considered and determined to be ineffective or inappropriate in reducing damage to acceptable levels. However, non-lethal methods may not always be applied as a first response to each damage problem encountered by WS. The most appropriate initial response to a wolf damage problem could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Wolf damage management would be conducted in Minnesota when the resource owners (property owners) request assistance to alleviate wolf damage, wolf damage is verified by WS, and an *Agreement for Control* or other comparable document has been completed. All wolf damage management would be consistent with other uses of the area and would comply with appropriate federal, state, and local laws, and court mandated restrictions.

### **3.1.4 Alternative 4 - Technical Assistance Only (Preventive Measures or Best Management Practices).**

Wolves in Minnesota are currently a federally protected "threatened" species and can only be taken by authorized federal or state personnel, not the general public, who would face stiff penalties for illegally killing wolves. Therefore, under alternative 4, the technical assistance recommendations that WS could provide to control wolf damage would be limited to preventive measures or best management practices as WS could not, under current federal regulations, instruct property owners in how to lethally control wolves. Best management practices (BMP) are defined as improvements in animal husbandry that could potentially prevent or mitigate predation on domestic animals. Individuals might choose to implement WS BMP recommendations, request lethal or non-lethal control actions from authorized agencies other than WS, or take no action. This alternative would place the immediate burden of preventive wolf damage management on property owners. Individuals seeking to prevent wolf damage would, independently or with WS recommendations, carry out and fund BMP.

### **3.1.5 Alternative 5 - Non-lethal Wolf Damage Management.**

Under this alternative, only non-lethal management approaches would be used or recommended by WS. Both non-lethal operational damage management services and technical assistance would be provided by WS. Requests for information regarding lethal management approaches would be referred to USFWS or MDNR. Individuals might choose to implement WS non-lethal recommendations, request lethal control actions from authorized agencies other than WS, contract for WS non-lethal damage management services, or take no action.



### 3.2 WOLF DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES USED BY WS.

Wildlife damage management is defined as the alleviation of damage or other problems caused by or related to the presence of wildlife (USDA 1997). The wildlife damage management approaches used by WS are described below:

#### 3.2.1 Integrated Wildlife Damage Management

During more than 80 years of resolving wildlife damage problems, WS has considered, developed, and used numerous methods of reducing damage problems (USDA 1997). WS's efforts have involved the research and development of new methods, and the implementation of effective strategies to resolve and prevent wildlife damage.

Usually, the most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. IWDM is the implementation and application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel. The WS Program applies IWDM, commonly known as Integrated Pest Management (WS Directive 2.105), to reduce damage through the WS Decision Model (Slate et al. 1992) discussed on page 3-5.

The philosophy behind IWDM is to implement effective management techniques in a cost-effective manner while minimizing the potentially harmful effects to humans, target and non-target species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques for the specific situations. IWDM may incorporate cultural practices, habitat modification, animal behavior modification, removal of individual animals, local population reduction, or any combination of these, depending on the characteristics of the specific damage problems.

#### 3.2.2 Integrated Wolf Damage Management Strategies used by WS consist of:

- **Technical Assistance and Non-lethal Recommendations** (management decision and implementation is the responsibility of the requester): WS personnel provide information, instructional and educational sessions, demonstrations and advice on BMP for preventing wolf damage. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. Bulletins and leaflets on BMP could be sent to requesters to inform them about preventive measures that could reduce the potential for damage by wolves. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on factors such as need and practical application. WS considers the biology and behavior of the damaging species, and other factors using the WS Decision Model (Slate et al. 1992). Technical assistance may require substantial effort by WS personnel in the decision making process, but the management decision and the actual damage reduction work is the responsibility of the requester.

Education is an important element of WS's program activities because wildlife damage management is about finding "balance" or coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are updated on recent developments in damage management technology, laws and regulations, and agency policies.

- **Operational Damage Management Assistance** (management conducted or supervised by WS personnel): Operational damage management assistance is implemented by WS when the problem cannot be resolved through technical assistance and when WS operational management assistance is requested, appropriate and cooperator funded. The initial investigation explores and defines the nature and history of the problem, extent of damage, and the species responsible for the damage. Professional skills of WS personnel are often required to resolve problems effectively and safely, especially if restricted pesticides are required or if the problem requires the direct supervision of a wildlife professional. WS considers the biology and behavior of the damaging species, and other factors using the WS Decision Model (Slate et al. 1992).

### 3.2.3 WS Decision Making

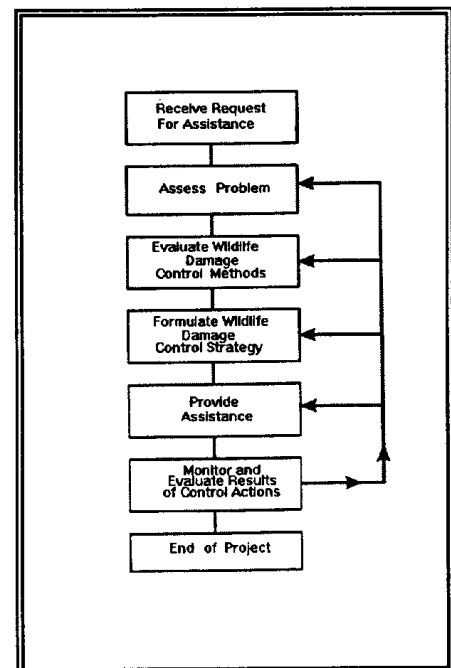
The procedures used by WS personnel to determine management strategies or methods applied to specific damage problems can be found in USDA (1997 Appendix N).

The WS Decision Model (Figure 3-1) considers the following factors before selecting or recommending damage management methods and techniques:

- Species responsible for the damage
- Magnitude, geographic extent, frequency, historical damage and duration of the problem
- Status of target and non-target species, including T&E species
- Local environmental conditions
- Potential biological, physical, economic, and social impacts
- Potential legal restrictions
- Costs of damage management option<sup>1</sup>

The decision making process is a procedure for evaluating and responding to damage complaints. WS personnel are frequently contacted after requesters have tried non-lethal techniques and found them to be inadequate for reducing damage to an acceptable level. Personnel assess the problem, methods are evaluated for their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situations are formed into a management strategy. After the management strategy has been implemented, monitoring and evaluation of the strategy is conducted to assess the effectiveness of the strategy. If the strategy is effective, the present need for management is ended.

When damage continues intermittently over time, WS personnel and the requester monitor and reevaluate the situation. If one method or a combination of methods fail to stop damage, a different strategy is implemented. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of a continuous feedback loop between receiving the request and monitoring the results, with the damage management strategy reevaluated and revised periodically if necessary.



<sup>1</sup>The cost of management may sometimes be secondary because of overriding environmental, legal, public health and safety, animal welfare or other concerns

### 3.2.4 Local Decision Making Process

The WS program in Minnesota follows the "Co-managerial approach" to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, WS provides technical assistance regarding the biology and ecology of wolves and effective, practical, and reasonable methods available to the local decision maker(s) to reduce wildlife damage. This includes non-lethal and lethal methods. Technical assistance on alleviating damage caused by wolves is also available from other state, federal, and private organizations. WS and other state and federal wildlife or wildlife damage management agencies may facilitate discussions at local community meetings when resources are available, and make recommendations. Resource owners and others directly affected by wolf damage or conflicts in Minnesota have direct input into the resolution of such problems. They may implement management recommendations provided by WS or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations. Local decision makers have the final decision on which available (legally and administratively) methods would be used to solve a wildlife-people conflict. They may also compare the benefits versus the damage when deciding which methods would be implemented. Local decision makers must also weigh the cost of implementing each methodology or a series of methodologies. These decision makers include community leaders, private property owners/managers, and public property owners/managers.

### 3.3 WOLF DAMAGE MANAGEMENT METHODS AUTHORIZED FOR USE OR RECOMMENDED BY WS

USDA (1997 Appendix J) describes methods currently used by the WS program. Several of these were considered in this assessment because of their potential use in reducing wolf damage to agriculture, property, and public health and safety. A listing and more detailed description of the methods used by Minnesota WS for wolf damage management is found in Appendix C of this EA.

#### 3.3.1 Non-lethal Wolf Damage Management Methods:

**Best Management Practices (BMP)** implemented by livestock producers to prevent or mitigate wolf damage might include: 1) maintaining healthy, well-fed animals, 2) pregnancy testing cattle, 3) properly disposing of dead livestock carcasses through rendering, burying, or burning, 4) conducting calving or lambing operations in close proximity to the farmyard, 5) penning vulnerable livestock at night where practical, 6) monitoring livestock on a regular basis to detect any disease, natural mortality, or predation factors, and 7) incorporating non-lethal methods. Property owners and land managers could implement their own BMP or request the assistance of other agencies or private organizations to implement them, or take no action.

**Exclusion** may be used to prevent or limit access by predators to livestock pastures, calving or lambing areas, or livestock confinement areas. Several designs of anti-predator fencing have been developed and tested. Where practical, sheep or other vulnerable livestock may be penned near farm buildings at night.

**Frightening Devices / Repellents** may include taste aversion (aversive conditioning), light/siren devices (Electronic Guard or Radio Activated Guard), flashing highway barricade lights, strips of flagging placed on fencelines, or bells placed on livestock.

**Livestock Guarding Animals** such as guarding dogs, donkeys, mules, llamas, and goats may be used to protect livestock from predators. Livestock guarding animals may distract, deter, or repel potential predators that could depredate on livestock.

**Compensation for Wolf Damage** in the form of monetary payments to livestock producers for full or partial value for domestic animals killed. Such payments may be made by state, federal, or private organizations.

**Capture and Relocation** of problem wildlife species is a technique that is sometimes used to alleviate wildlife damage problems. The success of a relocation effort, however, depends on the potential for the problem individuals to be captured efficiently and the existence of an appropriate relocation site (Nielsen 1988). While relocation may be appropriate in some situations when the species population is low, wolves are relatively abundant in much of the suitable habitat in Minnesota and relocation is not necessary for the maintenance of viable populations. Because wolves are relatively abundant in Minnesota, wolves relocated into suitable habitat are very likely to encounter other wolves with established territories. Wolves are highly territorial and the newly introduced wolves may trespass into already established wolf territories and be attacked and killed by the resident pack (Mech 1970).

Relocated wolves may also disperse long distances from the release site (Fritts 1983). Relocated wolves can potentially return to the damage sites from which they were removed (Fritts 1984), or after dispersal movements, cause damage problems at the dispersal site. In this case, the original damage problem has simply been shifted from one property to another.

### **3.3.2 Lethal Damage Management Methods:**

These methods involve damage management specifically designed to lethally remove wolves in certain situations to a level that stabilizes, reduces, or eliminates damage. The amount of removal necessary to achieve a reduction of wolf damage varies according to the effectiveness of other damage management strategies, the damage situation, and the level and likelihood of continued depredations.

**Shooting** is selective for the target species and may involve the use of either a shotgun or rifle.

**Leg-hold traps** can be effectively used to capture a variety of mammals. Although wolves could be live-captured by this method, all wolves would be euthanized. Effective trap placement, pan tension devices, and the selection and placement of appropriate lures by trained WS personnel contribute to the leg-hold trap's selectivity.

**Foot snares** are devices consisting of a cable loop and a locking device that captures an animal around their foot or lower leg. The cable may be activated around the lower leg with a spring (Aldrich) or trap-type (Belisle) device. The foot snare can be modified with a stop on the snare cable for live-capture and release.

**Neck snares** are devices consisting of a cable loop and a locking device that are placed in travel ways. Most snares are killing devices but can be modified with a stop on the snare cable for use as a live-capture device.

### **3.4 METHODOLOGIES CONSIDERED BUT DEEMED IMPRACTICAL, INEFFECTIVE, OR UNSAFE AT THE PRESENT TIME:**

**Toxicants** - No toxicants are currently registered for wolf damage management in Minnesota.

### **3.5 ALTERNATIVES CONSIDERED BUT NOT IN DETAIL, WITH RATIONALE**

#### **3.5.1 Eradication and Suppression**

An eradication and suppression alternative would direct all Minnesota WS wolf damage management efforts toward planned, total elimination or suppression (preventive control) of this species.

Eradication or suppression (preventive control) of wolves in Minnesota is not allowed under their current status as a federally threatened species. Thus, this alternative was not considered in detail.

Suppression would direct Minnesota WS program efforts toward managed reduction of certain problem wildlife populations or groups. To consider large-scale population suppression as a goal of the Minnesota WS program is not realistic, practical or allowable under present WS policy.

### **3.5.2 Population stabilization through birth control.**

Contraceptive measures for mammals can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immuno-contraception (the use of contraceptive vaccines). These techniques would require that wolves receive either single, multiple, or possibly daily treatment to successfully prevent conception. The use of this method would be subject to approval by federal and state agencies.

Surgical sterilization has been suggested as a means to managing wolf populations. This alternative was not considered in detail because: (1) it would take a number of years of implementation before the wolf population would decline, and, therefore, damage would continue at the present unacceptable levels for a number of years; (2) surgical sterilization would have to be conducted by licensed veterinarians, would therefore be extremely expensive; (3) it is difficult to effectively capture the number of wolves that would need to be sterilized in order to effect an eventual decline in the population; (4) no chemical or biological agents for contracepting wolves have been approved for use by state and federal regulatory authorities.

As with chemical repellents and toxicants, a reproduction inhibitor could potentially affect non-target wildlife and the environment. Any material would have to be intensively tested and approved for use. Additional research is needed before the environmental affects, and affects to populations and individual animals, from reproductive inhibitors are known. Should a technique or chemical become registered for use, it could be incorporated into the IWDM Program in Minnesota.

### **3.5.3 Bounties**

Minnesota administered various bounty and control programs for wolves from 1849 to 1974 (Fritts 1982). However, in August 1974, the Endangered Species Act of 1973 was invoked to provide legal protection to wolves. Control of depredating wolves was restricted to authorized state or federal personnel under stringent federal wolf management guidelines. Therefore, removal of depredating wolves in Minnesota based on bounty payments is currently not authorized.

## **3.6 MITIGATION AND SOPs FOR WOLF DAMAGE MANAGEMENT**

### **Mitigation and SOPs**

Mitigation is any feature of an action that serves to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Minnesota, uses many such mitigations and these are discussed in detail in Chapter 5 of USDA (1997). The following mitigations are incorporated into WS's SOPs and Alternatives 2, 3, 4, and 5:

Table 3-1. MITIGATION MEASURES	ALTERNATIVES				
	1	2	3	4	5
<b><i>Animal Welfare and Humaneness of Methods Used by WS</i></b>					
Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.		X	X	X	X
The Decision Model (Slate et al. 1992) would be used to identify effective biologically and ecologically sound wolf damage management strategies and their impacts.		X	X	X	X
Captured non-target animals would be released unless it is determined by the Minnesota WS personnel that the animal would not survive.		X	X		X
The use of traps and snares would conform to current laws and regulations administered by MDNR and Minnesota WS policy.		X	X		X
Where practical, euthanasia procedures approved by the AVMA that cause minimal pain would be used for live animals.		X	X		
The use of newly-developed, proven, non-lethal methods would be encouraged when appropriate.			X	X	X
<b><i>Safety Concerns Regarding WS' Wolf Damage Management Methods</i></b>					
The Decision Model (Slate et al. 1992), designed to identify the most appropriate damage management strategies and their impacts, would be used to determine wolf damage management strategies.		X	X	X	X
Wolf damage management conducted on public lands would be coordinated with the management agency.		X	X		X
Live traps would be placed so that captured animals would not be readily visible from any road or public area.		X	X		X
<b><i>Concerns about Impacts of Wolf Damage Management on T&amp;E Species, Species of Special Concern, and Non-target Species.</i></b>					
WS consulted with the USFWS regarding the nation-wide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.		X	X		X
Minnesota WS's take would be considered with the statewide "Total Harvest" (Minnesota WS take and fur harvest) when estimating the impact on wildlife species.		X	X		
Management actions would be directed toward localized populations or groups and/or individual offending animals, dependent on the magnitude of the problem.		X	X		X
WS personnel would be trained and experienced to select the most appropriate method for taking targeted animals and excluding non-target species.		X	X		X
WS would initiate informal consultation with the USFWS following any incidental take of T&E Species.		X	X		X

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

### 4.0 INTRODUCTION

Chapter 4 provides information for making informed decisions on the wolf damage management program outlined in Chapter 1, and the issues and affected environment discussed in Chapter 2. This chapter consists of: 1) analysis of environmental consequences, 2) analysis of each alternative against the issues considered in detail, and 3) summary of WS's impacts.

### 4.1 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences using Alternative 3 (the current program) as the no action alternative and therefore will be used as the baseline when comparing the other alternatives to determine if the real or potential impacts are greater, lesser or the same (Table 4-2). The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)) and is a viable and reasonable alternative that could be selected and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with the Council on Environmental Quality (CEQ) (1981).

The following resource values within Minnesota would not be adversely impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

**4.1.1 Social and Recreational Concerns** are discussed throughout the document as they relate to issues raised during public involvement, and they are discussed in USDA (1997).

**4.1.2 Cumulative and Unavoidable Impacts** are discussed in relationship to each of the wildlife species and the environmental impacts are analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. Analysis of the Minnesota WS "takes" during 1998-2000, and anticipated future WS take, in combination with other mortality, indicates that cumulative impacts are not adversely affecting the viability and health of populations. It is not anticipated that the WS program would result in any adverse cumulative impacts to T&E species, and wolf damage management activities do not jeopardize public health and safety.

**4.1.3 Irreversible and Irretrievable Commitments of Resources:** Other than minor uses of fuels for motor vehicles and electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the Minnesota WS program produces very negligible impacts on the supply of fossil fuels and electrical energy.

### 4.2 ISSUES ANALYZED IN DETAIL

This section presents the expected consequences of each alternative on each of the issues analyzed in detail.

#### 4.2.1 Alternative 1 - No WS Wolf Damage Management in Minnesota

Effects on wolf populations. WS would have no impact on gray wolf populations in Minnesota. In the absence of control, Minnesota's wolf population would continue to grow and expand its range in the state. Increased wolf numbers and expansion into more agricultural and urban areas of the state would result in increased instances of wolf depredation on domestic animals, exaggerated and negative publicity about the damage being caused by wolves, and create a strong potential for illegal killing of wolves by livestock producers or disgruntled members of the general public. Because the wolf is a federally protected species with a "threatened" status in Minnesota, the general public is prohibited from taking problem wolves and stiff penalties are in place for illegal killing of wolves. Livestock producers are dependent upon authorized

state or federal personnel to resolve wolf-livestock conflicts. Public taking of wolves can not occur in Minnesota until the Minnesota wolf population is federally delisted. At the present time, WS is the only authorized federal agency that is actively conducting wolf damage management in Minnesota. USFWS or MDNR personnel are also authorized by federal wolf management regulations to conduct wolf control activities but have elected not to do so. Individuals frustrated with a wolf management policy that does not provide for control of problem wolves may resort to illegal killing of wolves. Impacts on wolf populations would be variable dependent upon actions taken by other governmental agencies and affected individuals.

Effects on non-target species populations, including T&E species. In the absence of WS assistance, property owners could request other authorized state or federal agencies to conduct wolf control activities. Control actions and the methods used by these agents could affect non-target species populations or T&E species if these agents are inexperienced with the methods and techniques that are used to reduce wolf damage. Some individuals frustrated with wolf management policies might attempt to illegally shoot, trap, snare, or poison wolves with potential detrimental effects on non-target species or T&E species.

An uncontrolled, expanding wolf population could also negatively impact other wildlife species, especially wolf prey species. Wolves are an important predator on ungulate populations and may suppress or limit the populations of prey species under certain conditions.

Effects on public and pet health and safety. WS would have no impact on public and pet safety from the use of control methods. Impacts from non-WS personnel would be variable based upon the knowledge and skill of the person implementing wolf control methods. If wolf populations continue to increase without a damage management program in place, there are potential threats to public and pet health and safety from wolves that enter people's yards or attack their pets. Additionally, individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous use of these methods.

Humaneness of methods to be used. WS would have no impact on the humaneness of methods used. This alternative would be considered humane by many people that are opposed to WS's lethal control activities. Property owners could use preventive and non-lethal methods to reduce wolf damage with little effect on wolves. However, they could also request other authorized state or federal agencies to conduct wolf control activities that are no longer available from WS, including the use of lethal methods. Control actions undertaken by these agencies and the methods used by their agents may be less humane than those employed by WS if these agents are inexperienced with the methods and techniques that are used to reduce wolf damage. In addition, some property owners may take illegal action against localized populations of wolves out of frustration of continued damage. Some of these illegal actions may be less humane than methods used by experienced WS personnel.

Impact to stakeholders, including aesthetics of wildlife. WS would have no impact on stakeholders, including the aesthetics of wildlife. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. Property owners experiencing damage from wolves would likely strongly oppose this alternative because they would bear the damage caused by wolves. Animal activists and a minority of environmental activists would prefer this alternative because activists believe it is morally wrong to kill or use animals for any reason. Some people would support this alternative because they enjoy seeing wolves, or having wolves nearby. However, while WS would take no action under this alternative, other authorized agencies could conduct wolf damage management activities or some individuals might resort to illegal actions.



#### 4.2.2 Alternative 2 - Only Lethal Wolf Damage Management

Effects on wolf populations. This alternative could result in a localized decrease in the wolf population at the specific site where the damage management occurs. If wolves were lethally removed at all damage sites, WS anticipates (with continued growth of Minnesota's wolf population and the continued upward long-term trend in wolf-livestock conflicts) that 150-300 wolves could potentially be killed annually by WS during depredation control. These numbers represent 6-12 % of the current estimated population of 2,600 wolves. Wolf biologists and managers generally agree that healthy, productive wolf populations can sustain annual harvests of 28-53 % without permanently reducing their numbers (Mech 1970, 1999, Peterson et al. 1984, Fuller 1989, Ballard et al. 1987, 1997). Therefore, the impacts on wolf populations are expected to be similar to those described in Alternative 3. New wolves would likely recolonize removal sites as long as suitable habitat exists. The amount of time until new wolves move into the area would vary depending on the habitat type, time of year, and the population density of wolves in nearby areas. In our experience in Minnesota, some areas are recolonized by wolves within 6-12 months after wolf removal is completed.

Effects on non-target species populations species, including T&E species. Non-target species such as striped skunk, red fox, raccoon, white-tailed deer, badger, porcupine, snowshoe hare, black bear, fisher, bobcat, gray fox, cottontail rabbit, turkey vulture, raven, and feral dogs and cats may occasionally be captured during wolf damage management. Many of these animals can be released alive but others may have to be euthanized because of capture-related injuries.

WS impacts on non-target species, including T&E species, would be similar to those described in Alternative 3, except for those species that benefit from wolf population reduction. WS personnel would minimize non-target captures through careful placement of traps or snares, utilization of trap pan tension devices, or variation in capture methods. With regular checks of control equipment and through the use of wildlife immobilizing drugs, many non-target species can be successfully released from wolf traps.

Two federally protected T&E species that potentially could be affected by WS wolf trapping or snaring activities are the bald eagle and the Canada lynx. Minnesota has a large, expanding population of bald eagles. Eagles are common in the wolf range especially during spring and fall migration. Canada lynx occurred historically in Minnesota in very low numbers, but currently they are considered rare or nonexistent in the state.

Eagles scavenging on carcasses of livestock killed by wolves could accidentally be captured in traps or snares set by WS personnel around the carcasses. WS policy, however, prohibits agency personnel from setting traps closer than 30 feet to an exposed carcass. This setback distance reduces the likelihood of capturing any type of scavenging bird landing or walking in the immediate vicinity of the carcass. Wolf traps are also equipped with pan tension devices, and baits or lures that are less attractive to scavenging birds are utilized when trapping around livestock carcasses. Usually, if eagles are sighted near or observed feeding on a livestock carcass, control devices are not set near the carcass. Minnesota WS personnel have not captured any eagles while conducting wolf depredation control activities.

USFWS and WS wolf control personnel have captured bobcats but no Canada lynx during twenty-six years of wolf damage management activities in Minnesota. Lynx are rare in the state and should one be accidentally captured by WS personnel, it could be released because WS personnel carry and are trained in the use of wildlife immobilizing drugs.

Wildlife Services Canada Lynx Biological Assessment and Canada Lynx Management Policy for the Eastern Region (USDA March 27, 2001) determined that WS actions in the Region, including wolf depredation management in Minnesota, would have no effect on Canada lynx.

Effects on public and pet health and safety. WS methods of shooting and trapping pose minimal or no threat to public and pet health and safety and would have effects similar to those described in Alternative 3. All firearm safety precautions are followed by WS when conducting damage management and WS complies with all laws and regulations governing the lawful use of firearms. Shooting with shotguns or rifles would sometimes be used to reduce wolf damage problems when lethal methods are determined to be appropriate. Shooting is selective for target species. WS uses firearms to shoot captured wolves as humanely as possible. WS' traps and snares are strategically placed to minimize exposure to the public and pets. Appropriate warning signs are posted on properties where traps or snares are set to alert the public of their presence.

Firearm use is very sensitive and a public concern because of safety issues. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

This alternative provides relief from damage or threats to public health and safety to people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by wolf depredations on domestic animals, especially pets that are killed in their yards, express concern for human safety and insist upon the removal of wolves from their property when they cause damage. Wolves that have become habituated to humans (bold) are especially unpredictable.

Humaneness of methods to be used. WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Impacts of WS use of lethal control methods would be similar to those described in Alternative 3. Under this alternative, wolves would be humanely trapped, snared, or shot by experienced WS personnel using the best methods available. Tranquilizer trap devices (TTDs) can be used on wolf traps to effect the most humane capture of depredating wolves and to facilitate the release of non-target species. Some animal activists could perceive these methods as inhumane because they oppose all lethal methods of damage management.

Impacts to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. This alternative would likely be favored by property owners who are experiencing damage. Although, some property owners would be saddened if the wolves were removed. Animal rights activists and a minority of environmental activists would strongly oppose this alternative because they believe it is morally wrong to kill or use animals for any reason or they believe the benefits from wolves would outweigh the associated damage. The ability to view and aesthetically enjoy wolves at a particular site could be limited if the wolves are removed. New animals, however, would most likely use the site in the future, although the length of time until new wolves arrive is variable, depending on the habitat type, time of year, and population density of wolves in nearby areas. The opportunity to view wolves is available if a person makes the effort to visit sites with adequate habitat outside of the damage management area.

#### **4.2.3 Alternative 3 - Integrated Wolf Damage Management for all Private and Public Land (No Action and Proposed Action).**

Effects on wolf populations. Integrated wolf control management strategies and methods selected for use under this alternative would ensure maximum damage resolution with minimal negative environmental impacts. A State compensation program would continue to be a valuable method for reimbursing farmers for losses to wolves. Such a program is helpful in reducing farmer animosity towards wolves and in preventing a large wolf population from being an economic burden on livestock producers.

Livestock producers would be provided information about best management practices (animal husbandry) and non-lethal methods that may help reduce the potential for wolf damage at farms or mitigate such damage. Depending upon how practical or effective these practices or methods proved to be, there could be fewer requests for assistance in removing depredating wolves.

When wolves have killed livestock at farms, selective lethal control would be used to remove only those problem wolves involved in the depredations. This alternative could result in a localized decrease in the wolf population at the specific site where the damage management occurs. Under this alternative it is not anticipated that more than 150-300 wolves would be killed annually by WS during depredation control. These numbers represent 6-12% of the current estimated population of 2,600 wolves. Wolf biologists and managers generally agree that healthy, productive wolf populations can sustain annual harvests of 28-53 % without permanently reducing their numbers (Mech 1970, 1999, Peterson et al. 1984, Fuller 1989, Ballard et al. 1987, 1997). Control actions would only be initiated at farms where verified damage had occurred, and trapping would be conducted in accordance with USFWS regulations (50 CFR 17.40 (d)) and Federal court-mandated restrictions. New wolves would likely recolonize removal sites as long as suitable habitat exists. The amount of time until new wolves move into the area would vary depending on the habitat type, time of year, and the population density of wolves in nearby areas. In our experience in Minnesota, some areas are recolonized by wolves within 6-12 months after wolf removal is completed. Local population reductions as the result of depredation control activities would have no significant impact on the overall Minnesota wolf population.

As described in the wolf population impact analysis (Section 2.2.1), the current program removes only a small percentage of wolves from the statewide Minnesota population and therefore would not adversely impact gray wolf populations in Minnesota, Michigan, or Wisconsin. Unlike Alternative 2, the use of preventive measures (best management practices) and non-lethal methods could be used as part of an IWDM approach. The use of preventive or non-lethal methods would have little or no effect on the wolf population.

At the present time, the USFWS, MDNR, and many environmental groups are supportive of the current wolf depredation control approach being used by WS. While delisting of the Minnesota wolf population would allow for new management strategies, such as state control or public taking, the federal delisting process will likely take until the year 2004 or beyond.

The cumulative and indirect impacts of this program are sufficiently discussed in the Eastern Timber Wolf Recovery Plan (USFWS 1992). No additional cumulative or indirect impacts are expected as a result of any actions taken based on the analysis in this environmental assessment.

The overall effect of the current program has been positive for the recovery of Minnesota's wolf population under the protection of the Endangered Species Act. The successful resolution or abatement of wolf-livestock conflicts has helped to reduce the controversy that surrounds Minnesota's wolves, which in turn, has helped facilitate the successful recovery of wolves not only in Minnesota but in Wisconsin and Michigan as well.

Effects on non-target species populations, including T&E species. Non-target species such as striped skunk, red fox, raccoon, white-tailed deer, badger, porcupine, snowshoe hare, black bear, fisher, bobcat, gray fox, cottontail rabbit, turkey vulture, raven, and feral dogs and cats may occasionally be captured during wolf damage management. Many of these animals can be released alive but others may have to be euthanized because of capture-related injuries.

Table 4-1 represents the number of non-target species taken (killed/euthanized) by WS in leghold traps and neck snares in relation to the annual commercial fur harvest or public take in Minnesota. The take of

non-target animals by WS is well below the sustainable harvest level. It is concluded that WS cumulative impact on non-target species is biologically insignificant and has no impact on the viability of each species.

Table 4-1. Number of non-target species taken (killed/euthanized) by WS personnel in Minnesota compared to commercial fur harvest or public take for FY98 - FY00.

Species	WS Non-Target Take			Fur Harvest/Public Take		
	FY 1998	FY 1999	FY 2000	1998	1999	2000
Coyote	59	38	37	19,000	16,000	15,000
Striped Skunk	28	44	44	11,000	9,000	5,000
Red Fox	21	14	18	15,000	16,000	11,000
Raccoon	32	19	19	141,000	145,000	81,000
White-tailed Deer	7	5	4	142,000	168,000	193,079
Badger	1	8	3	2,000	<2,000	<2,000
Porcupine	2	2	3	unprotected	unprotected	unprotected
Snowshoe Hare	0	1	5	8,000	25,000	21,000
Black Bear	2	3	0	4,110	3,580	3,900
Fisher	0	1	1	2,761	2,695	1,725
Bobcat	1	0	0	359	103	206
Gray Fox	0	0	1	4,000	2,000	3,000
Cottontail Rabbit	0	0	1	65,000	89,000	59,000
Turkey Vulture	3	4	0	protected	protected	protected
Raven	2	1	1	protected	protected	protected
Feral Dog	4	2	0	unprotected	unprotected	unprotected
Feral Cat	0	0	1	unprotected	unprotected	unprotected
Total	162	142	138			

WS does not expect the rate of non-target species take to substantially increase above current program levels. The ADC FEIS (USDA 1997) determined using qualitative information (population trend indicators and harvest data) that if WS take is less than or equal to 33% of the total harvest, the magnitude is considered low. Magnitude is defined as a measure of the number of animals killed in relation to their abundance. Using available harvest data and the annual take by WS, the magnitude is considered extremely low for WS take of non-target species in Minnesota. Thus, cumulative take appears to be far beneath the level that would begin to cause a decline in these populations. Any other non-targets that may incidentally be taken by WS is expected to be minimal (less than 10 individuals per year) and should have no adverse effect on statewide non-target populations. MDNR has concurred with this finding (Con Christianson, MDNR, letter to B. Paul, WS, February 22, 2002).

FY1998 - FY2000 non-target take data in Table 4-1 compared to wolf take data in Table 2-1 indicates that the selected action is at least 52 % selective for the target species. Selectivity is lower than might be expected because the take of wolves is limited by federal regulations and populations of non-target species are usually much larger than local wolf populations at damage sites. Wolf control devices were set in the field for 17,247 trap nights in FY98, 15,231 trap nights in FY99, and 16,657 trap nights in FY00. A trap night is one trap set for one night. A non-target species was captured an average of one per 120 trap nights.

The USFWS has concurred with WS that wolf damage management activities would have no adverse effect on federally listed animal and bird T&E species in Minnesota (Dan Stinnett, USFWS, letter to B. Paul, WS, February 12, 2002).

The Minnesota DNR has indicated that WS wolf damage management activities would have no adverse effect on state listed animal and bird T&E species (B. Eliason, MDNR, letter to B. Paul, WS, February 22, 2002).

Effects on public and pet health and safety. WS methods of shooting and trapping pose minimal or no threat to public and pet health and safety. All firearm safety precautions are followed by WS when conducting damage management and WS complies with all laws and regulations governing the lawful use of firearms. Shooting with shotguns or rifles would sometimes be used to reduce wolf damage problems when lethal methods are determined to be appropriate. Shooting is selective for target species. WS uses firearms to shoot captured wolves as humanely as possible. WS' traps and snares are strategically placed to minimize exposure to the public and pets. Appropriate warning signs are posted on properties where traps or snares are set to alert the public of their presence.

Firearm use is very sensitive and a public concern because of safety issues. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

This alternative provides relief from damage or threats to public health and safety to people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by wolf depredations on domestic animals, especially pets that are killed in their yards, express concern for human safety and insist upon the removal of wolves from their property when they cause damage. Wolves that have become habituated to humans (bold) are especially unpredictable.

Humaneness of methods to be used. WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this alternative, wolves would be humanely trapped, snared, or shot by experienced WS personnel using the best methods available. Tranquilizer trap devices (TTDs) can be used on wolf traps to effect the most humane capture of depredating wolves and to facilitate the release of non-target species. Some animal activists could perceive these methods as inhumane because they oppose all lethal methods of damage management.

Impacts to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. This alternative would likely be favored by property owners who are experiencing damage. Although, some property owners would be saddened if the wolves were removed. Animal rights activists and a minority of environmental activists would strongly oppose this alternative because they believe it is morally wrong to kill or use animals for any reason or they believe the benefits from wolves would outweigh the associated damage. The ability to view and aesthetically enjoy wolves at a particular site could be limited if the wolves are removed. New animals, however, would most likely use the site in the future, although the length of time until new wolves arrive is variable, depending on the habitat type, time of year, and population density of wolves in nearby areas. The opportunity to view wolves is available if a person makes the effort to visit sites with adequate habitat outside of the damage management area.

Public reaction would be variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans

and wildlife. The IWDM approach, which includes non-lethal and lethal methods as appropriate, provides relief from damage or threats to public and pet health or safety to people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by problems and threats to public and pet health or safety caused by wolves insist upon their removal from the property or public location when the wildlife acceptance capacity is reached or exceeded. Some people will have the opinion that wolves should be captured and relocated to a rural area to alleviate damage or threats to public and pet health or safety. Some people would strongly oppose removal of wolves regardless of the amount of damage. Individuals not directly affected by the threats or damage may be supportive, neutral, or totally opposed to any removal of wolves from specific locations or sites. Some people that totally oppose lethal damage management want WS to teach tolerance for wolf damage and threats to public and pet health or safety, and that wolves should never be killed.

#### **4.2.4 Alternative 4 - Technical Assistance Only.**

Effects on wolf populations. Because wolves are a federally protected "threatened" species in Minnesota, the technical assistance that WS could provide to control wolf damage would be limited to preventive measures or best management practices (BMP). WS could not, under current federal regulations, instruct property owners in how to lethally control wolves. Thus, WS technical assistance would have no effect on the wolf population. If wolf damage occurred, property owners could request lethal control actions from authorized agencies other than WS. Some property owners may take illegal actions against local wolf populations out of frustration if preventive or BMP measures fail resulting in impacts similar to Alternative 1.

Effects on non-target species populations, including threatened and endangered (T&E) species.

In the absence of WS direct control assistance, property owners could request other authorized state or federal agencies to conduct wolf control activities. Control actions and the methods used by these agents could affect non-target species populations or T&E species if these agents are inexperienced with the methods and techniques that are used to reduce wolf damage. Some individuals frustrated with wolf management policies might attempt to illegally shoot, trap, snare, or poison wolves with potential detrimental effects on non-target species or T&E species.

An uncontrolled, expanding wolf population could also negatively impact other wildlife species, especially wolf prey species. Wolves are an important predator on ungulate populations and may suppress or limit the populations of prey species under certain conditions.

Effects on public and pet health and safety. WS would have no impact on public and pet safety from the use of control methods. Impacts from non-WS personnel would be variable based upon the knowledge and skill of the person implementing wolf control methods. If wolf populations continue to increase without a damage management program in place, there are potential threats to public and pet health and safety from wolves that enter people's yards or attack their pets. Additionally, individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous use of these methods.

Humaneness of methods to be used. The issue of humaneness as it relates to WS use of control methods under this alternative is not applicable because property owners would be responsible to implement the preventive management methods. Some property owners may take illegal action against local populations of wolves out of frustration. Some of these illegal actions may be less humane than methods used by WS personnel.

Impact to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would vary depending on the preventive management efforts employed by property owners, their values

toward wildlife, and compassion for their neighbors. Property owners who are experiencing damage from wolves would likely oppose this management alternative. Some people would support this alternative because it would have little effect on wolf populations. Others would oppose this alternative because they believe property owners would resort to illegal, inhumane, or environmentally unsafe wolf control methods. While WS could only provide technical assistance under this alternative, other authorized agencies could conduct wolf damage management without implementing the recommendations of WS.

#### **4.2.5 Alternative 5 - Non-lethal Wolf Damage Management.**

Effects on wolf populations. WS would not lethally remove wolves under this alternative and therefore would not impact gray wolf populations in Minnesota. Several methods included in this alternative have been and are currently being utilized for control of wolf depredations on livestock in Minnesota. Improvements by farmers in animal husbandry practices (BMP) and the utilization of livestock guarding animals or frightening devices has the potential for reducing wolf damage and the number of wolves that need to be lethally controlled. These methods, however, have not proven effective in preventing wolf damage in Minnesota. Results of field tests or observations of the effectiveness of various non-lethal methods of wolf damage control are discussed in Appendix C.

Compensation payments to livestock producers for wolf damage has helped to appease some of their animosity about wolf depredations; however, many producers are dissatisfied with the current State compensation program and have asked for the program to be revamped. Many feel that they are not being paid full market value for their losses because a \$750 maximum (\$400 until 1998) per animal is used and missing livestock (presumably killed by wolves) are not authorized for compensation. The State's compensation program has also run out of money in past years with producers sometimes waiting several months for their claims to be processed and paid.

Dissatisfaction by farmers with non-lethal methods or wolf compensation programs will likely lead to illegal killing of wolves if wolf-livestock conflicts are not resolved.

Non-lethal methods also will not prevent the expansion of wolves into more agricultural areas where the chances for conflicts with domestic animals are greater. The Eastern Timber Wolf Recovery Plan (Bailey 1978, FWS 1992) set up different management zones for the Minnesota wolf range and recommended wolf population densities for each zone. Low densities were recommended for Zone 4 and no wolves were recommended for Zone 5. Currently, Wolf Management Zones 4 and 5 have high or expanding densities of wolves that need to be controlled in order to minimize livestock depredations. Wolf population growth and range expansion cannot be controlled with non-lethal methods.

Under Alternative 5, only non-lethal methods to alleviate damage could be implemented by WS. If non-lethal methods failed to resolve wolf damage, property owners might request lethal control actions from other authorized agencies. Some property owners may take illegal, unsafe, or environmentally harmful action against local populations of wolves out of frustration. Impacts on wolf populations would be variable dependent upon actions taken by other governmental agencies and affected individuals.

Effects on non-target species populations, including T&E species. WS non-lethal recommendations would not effect non-target species populations. However, in the absence of an integrated wolf damage management program, property owners could request other authorized state or federal agencies to conduct wolf control activities. Control actions and the methods used by these agents could affect non-target species populations or T&E species if these agents are inexperienced with the methods and techniques that are used to reduce wolf damage. Some individuals frustrated with wolf management policies might attempt to illegally shoot, trap, snare, or poison wolves with potential detrimental effects on non-target species or T&E species.

An uncontrolled, expanding wolf population could also negatively impact other wildlife species, especially wolf prey species. Wolves are an important predator on ungulate populations and may suppress or limit the populations of prey species under certain conditions.

Effects on public and pet health and safety. WS would have no impact on public and pet safety from the use of lethal control methods. Impacts from non-WS personnel would be variable based upon the knowledge and skill of the person implementing wolf control methods. If wolf populations continue to increase without a damage management program in place, there are potential threats to public and pet health and safety from wolves that enter people's yards or attack their pets. Additionally, individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous use of these methods.

Humaneness of methods to be used. Under this alternative, only non-lethal wolf damage management methods could be implemented. WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Some animal activists may perceive this approach as humane because they oppose all lethal methods of damage management. However, without effective damage management methods available, some property owners may take illegal action against local populations of wolves out of frustration of continued damage. Some of these illegal actions may be less humane than methods used by WS personnel. While WS could only provide non-lethal assistance under this alternative, other authorized state and federal agencies could conduct wolf control actions for property owners experiencing damage and the humaneness of their methods could be different than that of WS.

Impact to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would be variable depending on the non-lethal damage management efforts employed by property owners, their values toward wolves, and compassion for their neighbors. Property owners who are suffering damage from wolves would likely oppose this management alternative. Some people would support this alternative because it would have little effect on the wolf population. Others would oppose this alternative because they believe property owners would resort to illegal, inhumane, or environmentally unsafe methods. While WS could only provide non-lethal assistance under this alternative, other authorized state and federal agencies could conduct lethal damage management.

#### **4.3 SUMMARY OF WS's IMPACTS**

Table 4-2 presents a relative comparison of the anticipated impacts of each of the alternatives as they relate to each of the major issues identified in Chapter 2.

##### **4.3.1 Cumulative Impacts**

No significant cumulative environmental impacts are expected from any of the alternatives (Table 4-2). With regard to Alternative 2, Lethal Removal Only, and Alternative 3, the Proposed Action, the lethal removal of wolves causing damage in Minnesota would have no adverse affect on wolf populations in the state of Minnesota, Wisconsin, or Michigan. No risk to public or pet health and safety is expected from the proposed alternative. Although some persons would likely oppose lethal removal of wolves, the analysis in this EA indicates that such removals would result in no significant cumulative adverse impacts on the quality of the human environment.



**Table 4-2. Cumulative Impacts**

Issues/Impacts	Alternative 1: No Program	Alternative 2: Lethal Only	Alternative 3: IWDM Program (Proposed Action/No Action)	Alternative 4: Technical Assistance	Alternative 5: Non-lethal Only
Wolf populations	Populations could increase unless resource owners seek non-WS help.	Possible reduction in local populations, no statewide effect.	Possible reduction in local populations, no statewide effect.	Populations could increase unless resource owners seek non-WS help.	Populations could increase unless resource owners seek non-WS help.
Non-target Species, Including T&E Species	No effects by WS.	No adverse impact to T&E or non-target species populations.	No adverse impact to T&E or non-target species populations.	No effects by WS.	No adverse impact to T&E or non-target species populations.
Public and Pet Safety	No effect by WS. Continued risk of damage.	No increased threat to safety. Reduction of risks.	No threat to public and pet safety. Reduction of risks.	No effect by WS. Continued risk of damage.	No increased threat to safety. Reduction of risks.
Humaneness of Method	Not applicable because no action by WS.	WS uses the most humane methods available. Some activists would oppose all lethal methods.	WS uses the most humane methods available. Some activists would oppose all lethal methods.	Probably considered more humane by most people than lethal measures.	Probably considered more humane by most people than lethal measures.
Impact to Stakeholders, Including Aesthetics	Variable. Some people prefer this method. Those receiving damage probably oppose this alternative.	Variable. Those receiving damage would probably favor this alternative. Some activists would oppose this alternative.	Variable. Those receiving damage would probably favor this alternative. Some activists would oppose this alternative.	Variable. Some people prefer this method. Those receiving damage probably oppose this alternative.	Variable. Those receiving damage would probably favor this alternative. Some activists would oppose this alternative.

## **CHAPTER 5:**

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## **APPENDIX B**

### **APPENDIX B AUTHORITY AND COMPLIANCE**

#### **Wildlife Services Legislative Authority**

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Animal Damage Control Act of 1931, as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

*"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."*

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

*"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."*

#### **U.S. Fish and Wildlife Service Authorization**

The USFWS Region 3 Office, Twin Cities, MN, issues WS a permit (Federal Endangered Species Permit PRT-697830 and Subpermit 02-01) each year to conduct wolf damage management activities in Minnesota in accordance with regulations 50 CFR 17.40(d)(2)(i)(B)(4). Verification of wolf depredation must precede initiation of control actions. All wolf damage management by WS is conducted in compliance with federal regulations and court-ordered restrictions.

#### **Minnesota Department of Natural Resources Authorization**

The Commissioner of the Minnesota DNR (MDNR) is authorized by Minnesota Statutes, 1996, Chapters 84 and 97, sections 84.027 and 97A.045, to provide for the control, management, restoration, conservation and regulation of bird, fish, game, forestry and all wildlife resources of the state.

Memorandum of Understanding (MOU) #9872272754 allows USDA-APHIS-WS to participate in a cooperative wildlife damage management program in Minnesota. This MOU establishes a cooperative relationship between WS, the MDNR, the MDA, the Minnesota Board of Animal Health (MBAH), the Minnesota Department of Health (MDH), and the University of Minnesota Extension Service (UME), for planning, coordinating and implementing wildlife damage management policies to prevent or minimize damage caused by wild animal species (including threatened and endangered species) to agriculture, horticulture, aquaculture, animal husbandry, forestry, wildlife, public health/safety, property, natural resources and to facilitate the exchange of information among the cooperating agencies.

## **APPENDIX B**

MDNR special permit No. 10842 authorizes WS on an annual basis to take, or take and release protected birds and mammals in reasonable numbers to alleviate animal damage problems. The permittee must also obtain applicable federal permits. State hunting and trapping regulations do not apply provided that the permittee is in full compliance with federal laws, rules, and regulations.

### **National Environmental Policy Act (NEPA)**

Environmental documents pursuant to NEPA must be completed before work plans consistent with the NEPA decision can be implemented. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

### **Endangered Species Act (ESA)**

It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act [Sec. 2(c)]. WS conducts Section 7 consultations with the FWS to use the expertise of the FWS to ensure that "any action authorized, funded or carried out by such an agency. . . is not likely to jeopardize the continued existence of any endangered or threatened species. . . Each agency shall use the best scientific and commercial data available" [Sec. 7(a)(2)].



## APPENDIX C

### METHODS USED BY MINNESOTA WS FOR WOLF DAMAGE MANAGEMENT

Property owners and government agencies have used a variety of techniques to prevent or reduce wolf damage. However, all lethal and non-lethal methods developed to date have limitations based on costs, logistics, or effectiveness. Below is a discussion of wolf damage management methods currently available to the Minnesota WS Program. If other methods are proven effective and legal to use in Minnesota, they could be incorporated into the Minnesota WS program.

#### NON-LETHAL DAMAGE MANAGEMENT METHODS:

**Best Management Practices (BMP)** implemented by livestock producers to prevent or mitigate wolf damage might include: 1) maintaining healthy, well-fed animals, 2) pregnancy testing cattle, 3) properly disposing of dead livestock carcasses through rendering, burying, or burning, 4) conducting calving or lambing operations in close proximity to the farmyard, 5) penning vulnerable livestock at night where practical, 6) monitoring livestock on a regular basis to detect any disease, natural mortality, or predation factors, and 7) incorporating non-lethal methods. Property owners and land managers could implement their own BMP or request the assistance of other agencies or private organizations to implement them, or take no action.

Mech et al. 2000 examined whether wolf depredations on livestock are fostered by the type of animal husbandry practiced. The study tried to detect factors that might predispose farms in Minnesota to wolf depredations. Interviews with 41 cattle farmers experiencing chronic cattle losses to wolves (chronic farms) were compared with results from 41 nearby "matched" farms with no wolf losses to determine farm characteristics or husbandry practices that differed and that therefore might have affected wolf depredations. A Geographic Information System (GIS) was used to detect any habitat differences between the 2 types of farms. The study found no differences between chronic and matched farms in the 11 farm characteristics and management practices that were surveyed, except that farms with chronic losses were larger, had more cattle, and had herds farther from human dwellings. Habitat types were the same around farms with and without losses. The role of proper livestock carcass disposal as a possible factor predisposing farms to wolf depredations remains unclear.

**Exclusion** may be used to physically prevent wolves from gaining access to livestock pastures, calving or lambing areas, or livestock confinement areas. Several designs of anti-predator fencing have been developed and tested (Thompson 1979, Dorrance and Bourne 1980, Linhart et al. 1982). Such fencing may be practical for small livestock pastures or confinement areas but is probably cost prohibitive for larger livestock pastures. Wolves have the ability to jump over or dig under fences, so the fencing design must be of sufficient height and bottom repellency to deter wolves. Where practical, sheep or other vulnerable livestock may be penned near farm buildings at night to reduce the likelihood of wolf depredations. However, WS personnel have documented a number of instances where wolves have killed livestock in barnyards near farm buildings or entered open-sided barnyard shelter/loafing buildings.

**Frightening Devices / Repellents** may include taste aversion (aversive conditioning), light/siren devices (Electronic Guard or Radio Activated Guard), flashing highway barricade lights, strips of flagging placed on fence lines, or bells placed on livestock.

Taste aversion tests using lithium chloride as the aversive agent were conducted in Minnesota during 1979 and 1980. Baits consisting of ground beef mixed with a solution of lithium chloride and wrapped in cowhide were distributed on and near several cattle operations with chronic wolf depredations in an effort to establish taste-aversion conditioning (Gustavson et al. 1976). It was hoped that the wolves would consume the baits, become ill, and develop an aversion to the taste of beef. Test results showed that wolves did consume the baits, but if any aversion was developed, it was only temporary. Of the farms treated, most had wolf depredations within the same year of treatment or the following year.

WS testing of various frightening devices suggests that the devices are probably not effective in deterring wolf depredations in large wooded or brushy pastures. They are most useful in small, open pasture situations or around areas

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where livestock are penned. In most situations, frightening devices provide only temporary protection or reduction in damage. The devices must be moved around frequently to prevent predators from becoming habituated to their location and simply avoiding or going around them.

**Livestock Guarding Animals** such as guarding dogs, donkeys, mules, llamas, and goats may be used to protect livestock from predators. Livestock guarding animals may distract, deter, or repel potential predators that could depredate on livestock.

Livestock guarding dogs have been utilized to protect livestock from predators with varying degrees of effectiveness (L. Coppinger and R. Coppinger 1980, 1982, Green et al. 1984, Green and Woodruff 1990). They have proven most useful in the Western states for protecting sheep from coyotes. Such livestock is often grazed on open range land. FWS and WS wolf depredation control personnel have conducted experiments with and promoted the use of guard dogs at Minnesota farms suffering wolf depredations. While the dogs may help to reduce losses, they have not been effective in preventing wolf depredations at farms where they have been studied. Producer interest in utilizing the dogs has been low for the following reasons: (1) the dogs are expensive to purchase and maintain, (2) the dogs must be properly trained to be effective, (3) it is difficult for the dogs to protect livestock (especially cattle) that are dispersed in pasture areas that often include woods and brush, (4) Minnesota farms are smaller compared to Western range operations and dogs that exhibit a roaming tendency often get into trouble when they stray off the farm, and (4) wolves attack and kill domestic dogs each year in Minnesota and are capable of killing guard dogs.

WS personnel continue to promote the use of livestock guarding animals for control of wolf damage where appropriate. Further testing of this method to determine better effectiveness might encourage increased cooperation from producers.

**Compensation for Wolf Damage** in the form of monetary payments to livestock producers or property owners for full or partial market value for domestic animals killed. Such payments may be made by state, federal, or private organizations.

A State program was enacted in 1978 to provide compensation to farmers for losses of livestock destroyed by wolves (Minnesota Statutes 1978, Section 3.737). Supporters of this legislation claimed that livestock depredations were proliferating and that farmers were sustaining considerable financial losses. The new law provided compensation of up to \$400 per animal for livestock killed or injured by wolves. The program is administered by and compensation payments are made through the Minnesota Department of Agriculture. The responsibility for verifying claims of wolf depredation and determining the market value of the livestock was given to the local Minnesota Department of Natural Resources (MDNR) conservation officer and the University of Minnesota Agricultural Extension Service's county extension agent, respectively. In 1998, the amount of compensation provided per animal was increased from \$400 to \$750. This program is still in effect with total annual payments for wolf damage ranging from \$43,580 to \$84,345 during 1996-2000.

Compensation payments to livestock producers for wolf damage has helped to reduce farmer animosity towards wolves and increase tolerance of federal wolf damage management policies. However, many livestock producers are not satisfied with the current compensation system because: 1) payment is only made for verified losses and not for "missing" livestock potentially killed by wolves, 2) in some cases, the maximum payment authorized per animal does not fully reimburse the producer for the market value of the livestock lost, and 3) the State's compensation program has run out of money in past years with producers sometimes waiting several months for their claims to be processed and paid.

**Capture and Relocation** of problem wildlife species is a technique that is sometimes used to alleviate wildlife damage problems. The success of a relocation effort, however, depends on the potential for the problem individuals to be captured efficiently and the existence of an appropriate relocation site (Nielsen 1988). While relocation may be appropriate in some situations when the species population is low, wolves are relatively abundant in much of the suitable habitat in Minnesota and relocation is not necessary for the maintenance of viable populations. Because wolves are

## APPENDIX C

relatively abundant in Minnesota, wolves relocated into suitable habitat are very likely to encounter other wolves with established territories. Wolves are highly territorial and the newly introduced wolves may trespass into already established wolf territories and be attacked and killed by the resident pack (Mech 1970).

Because of the ESA, the FWS was prohibited from killing wolves captured at the farms from 1975 through early 1978. As an alternative, Federal personnel tried translocating the wolves into remote areas of northern Minnesota. Altogether, 108 wolves were translocated. Fritts et al. (1984) studied and described movements of these translocated wolves. The study data showed that relocation of livestock-depredating wolves was not an adequate solution to depredation problems.

Relocated wolves may also disperse long distances from the release site (Fritts 1983). Relocated wolves can potentially return to the damage sites from which they were removed (Fritts 1984), or after dispersal movements, cause damage problems at the dispersal site. In this case, the original damage problem has simply been shifted from one property to another.

### LETHAL DAMAGE MANAGEMENT METHODS

These methods involve damage management specifically designed to lethally remove wolves in certain situations to a level that stabilizes, reduces, or eliminates damage. The amount of removal necessary to achieve a reduction of wolf damage varies according to the effectiveness of other damage management strategies, the damage situation, and the level and likelihood of continued depredations. Despite the numerous damage management methods developed, trapping remains the most effective method of removing wolves from specific damage areas. Intensive trapping can eliminate or greatly reduce the wolf populations in limited areas. Specific methods of lethal population reduction involve removing wolves with leg-hold traps, snares, and shooting. Wolves can also be live-captured with leg-hold traps, foot snares, or neck snares equipped with a stop. However, because WS no longer relocates wolves in Minnesota, wolves that are live-captured would subsequently be euthanized. These specific methods are described in USDA (1997, Appendix J: 9 - 12). A formal risk assessment of all mechanical devices used by the WS program in Minnesota can be found in USDA (1997, Appendix P). These techniques are usually implemented by WS personnel because of the technical training required to use such devices.

These methods involve damage management specifically designed to lethally remove wolves in certain situations to a level that stabilizes, reduces, or eliminates damage. The amount of removal necessary to achieve a reduction of wolf damage varies according to the effectiveness of other damage management strategies, the damage situation, and the level and likelihood of continued depredations.

**Shooting** is selective for target species and may involve either a shotgun or rifle. Shooting is an effective, but opportunistic, method to remove small numbers of wolves in damage situations. During the summer months when livestock depredations occur, wolves mostly hunt at night, and thus opportunities to observe and shoot wolves during daylight hours is limited. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management options because it offers the potential of resolving a problem more quickly and selectively than some other methods, but it does not always work. Shooting may sometimes be one of the only wolf damage management options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms while performing their duties.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

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**Leg-hold traps** can be effectively used to capture a variety of mammals. Although wolves could be live-captured by this method, all wolves would be euthanized. Effective trap placement, pan tension devices, and the selection and placement of appropriate lures by trained WS personnel contribute to the leg-hold trap's selectivity. An advantage of leg-hold traps over other lethal control methods is that they allow for the on-site release of non-target animals that might accidentally be captured.

FY1998 - FY2000 non-target take data in Table 4-1 compared to wolf take data in Table 2-1 indicates that the selected action is at least 52 % selective for the target species. Selectivity is lower than might be expected because the take of wolves is limited by federal regulations and populations of non-target species are usually much larger than local wolf populations at damage sites. Wolf control devices were set in the field for 17,247 trap nights in FY98, 15,231 trap nights in FY99, and 16,657 trap nights in FY00. A trap night is one trap set for one night. A non-target species was captured an average of one per 120 trap nights.

WS personnel set leg-hold traps beside, or in some situations, in travel ways being actively used by wolves. Traps are also set at an appropriate distance near the remains of livestock carcasses that have been killed by wolves. Leg-hold traps in size #4 Livestock Protection Company, Alpine, TX, are used. These traps have rounded, offset jaws and are equipped with a pan tension device. Tranquilizer trap devices (TTDs) to chemically immobilize captured animals can be attached to the trap jaw.

Traps set for wolves are checked on a daily basis by WS personnel. By Minnesota District Court order (Federal Judge P. McNulty on July 14, 1978; order modified by Federal Judge Miles Lord on May 2, 1985), all trapping for wolf depredation control must be restricted to within 1/2 mile of the affected farm or residence. Therefore, control devices are only set on the property of the complainant or immediately adjacent to it. Trapping is usually conducted for a period of 10-15 days following a verified depredation, or for a maximum of 21 days in instances where depredations recur at the same farm within a given year. In addition, "chronic" problem farms will be trapped for up to 21 days each time there is a verified depredation.

Also, by District Court order, any wolf pups captured during control trapping on or before August 1 must be released on-site, as they are not considered capable of being a depredating animal until after that date. Pups are released by use of a neck restraining pole or through chemical immobilization.

**Foot snares** are devices consisting of a cable loop and a locking device that captures an animal around their foot or lower leg. The cable may be activated around the lower leg with a spring (Aldrich) or trap-type (Belisle) device. Foot snares are live-capture devices where the captured animal is euthanized. The foot snare can also be modified with a stop on the snare cable for live-capture and release.

WS personnel have tested the Belisle foot snare as a wolf capture device, but have found it to be less efficient or effective at capturing wolves than the leg-hold trap.

**Neck snares** are devices consisting of a cable loop and a locking device that are placed in wolf travel ways. Neck snares are easier than leg-hold traps to keep operational during periods of inclement weather. Because of the size of the snare loop needed to capture wolves, wolf snares are set outside of livestock activity areas to avoid accidental capture of livestock. Neck snares are killing devices but they can be modified with a stop on the snare cable for use as a live-capture device.

# APPENDIX D

## SUMMARY OF BASIC DATA FROM USDA WOLF-LIVESTOCK DEPREDAATION CONTROL PROGRAM IN MINNESOTA, 1986-99

	1996	1997	1998	1999
Total complaints received	160	209	249	205
Complaints received involving livestock	134	178	201	174
Total complaints verified*	99	125	145	114
No. complaints involving livestock that were verified	85	109	113	95
Percentage of total complaints that were verified	61.9	59.8	58.2	55.6
No. complainants	128	175	218	178
No. farms where livestock (excluding dogs) were verified lost by USDA	69	83	99	87
Domestic animals claimed lost to wolves to USDA				
13 cows	1 bull, 21 cows	21 cows	20 cows	
5 yrl., 115 calves	7 yrl., 146 calves	5 yrl., 186 calves	7 yrl., 151 calves	
35 sheep	62 sheep	78 sheep	20 sheep	
1,612 turkeys	1,183 turkeys	140 turkeys	887 turkeys	
3 horses	4 horses	5 horses	2 horses, 1 goat	
2 geese	1 goat	4 goats, 7 pigs	2 llamas, 12 chickens	
11 dogs	15 dogs	25 dogs	20 dogs	
Domestic animals verified by USDA as lost to wolves				
7 cows	15 cows	16 cows	13 cows	
5 yrl., 62 calves	5 yrl., 81 calves	2 yrl., 100 calves	4 yrl., 79 calves	
21 sheep	35 sheep	33 sheep	3 sheep	
1,612 turkeys	1,140 turkeys	140 turkeys	887 turkeys, 1 horse	
1 horse, 2 geese	1 goat	4 horses, 1 goat	1 goat, 2 chickens	
10 dogs	12 dogs	25 dogs	18 dogs	
Complaints trapped	83	106	110	92
Wolves captured	167	227	166	163
Wolves killed	154	216	161	151

\* A verified complaint is one in which USDA determines that wolves have killed or maimed one or more domestic animals as evidenced by (1) observing wounded animals or remains of animals killed and (2) finding evidence of wolf involvement.

### Other useful facts

1. Total farms in Minnesota wolf range - 8,000 (1997)
2. Total cattle in Minnesota wolf range - 232,000 (1986)
3. Total sheep in Minnesota wolf range - 16,000 (1986)
4. Estimated number of wolves in Minnesota - 2,445 (1988) (population increasing)

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## SUMMARY OF BASIC DATA FROM USDA WOLF-LIVESTOCK DEPREDAATION CONTROL PROGRAM IN MINNESOTA, 2000

	2000
Total complaints received	202
Complaints received involving livestock	161
Total complaints verified*	114
No. complaints involving livestock that were verified	85
Percentage of total complaints that were verified	56.4
No. complaints	177
No. farms where livestock (excluding dogs) were verified lost by USDA	84
Domestic animals claimed lost to wolves to USDA	1 bull, 13 cows 2 yrl., 152 calves 34 sheep 514 turkeys 4 horses 29 ducks 42 dogs
Domestic animals verified by USDA as lost to wolves	8 cows 2 yrl., 84 calves 19 sheep 514 turkeys 1 horse, 28 ducks 17 dogs
Complaints trapped	89
Wolves captured	153
Wolves killed	148

\* A verified complaint is one in which USDA determines that wolves have killed or maimed one or more domestic animals as evidenced by (1) observing wounded animals or remains of animals killed and (2) finding evidence of wolf involvement.

### Other useful facts

1. Total farms in Minnesota wolf range - 8,000 (1997)
2. Total cattle in Minnesota wolf range - 232,000 (1986)
3. Total sheep in Minnesota wolf range - 16,000 (1986)
4. Estimated number of wolves in Minnesota - 2,600 (2000)  
(population stable)

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Compensation paid by Minnesota Department of Agriculture for livestock destroyed by wolves

Calendar Year	No. claims made	No. claims paid	No. farmers to which claims paid	Amount Paid	Losses authorized for payment
1992	61	58	47	\$23,339.10	4 cows, 1 yrl., 45 calves, 2 horses, 1 buck, 28 ewes, 18 lambs, 3 pigs, 131 turkeys
1993	61	58	46	31,182.38	13 cows, 3 yrl., 37 calves, 17 ewes, 16 lambs, 610 turkeys
1994	72	71	62	31,223.84	12 cows, 4 yrl., 65 calves, 2 horses, 5 ewes, 9 lambs, 114 turkeys, 24 chickens
1995	67	67	61	34,096.77	16 cows, 6 yrl., 66 calves, 1 horse, 4 ewes, 12 lambs, 93 turkeys
1996	90	89	55	43,579.68	6 cows, 3 yrl., 68 calves, 2 horses, 6 ewes, 14 lambs, 1,599 turkeys
1997	100	99	72	50,262.50	1 bull, 18 cows, 6 yrl., 84 calves, 34 ewes, 10 lambs, 1,140 turkeys
1998 <sup>c</sup>	119	119	95	71,766.55	17 cows, 5 yrl., 129 calves, 4 horses, 16 ewes, 53 lambs, 140 turkeys, 1 goat

cont.

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## Compensation paid by Minnesota Department of Agriculture for livestock destroyed by wolves

Calendar Year	No. claims made	No. claims paid	No. farmers to which claims paid	Amount Paid	Losses authorized for payment
1999	90	90	69	\$68,479.50	17 cows, 2 yrl., 85 calves, 1 horse, 2 ewes, 3 lambs, 899 turkeys
2000	82	82	63	\$84,344.69	19 cows, 1 yrl., 104 calves, 1 horse, 21 ewes, 12 lambs, 576 turkeys, 132 ducks

<sup>a</sup> Figures for 1977 probably underrepresent losses because of the 1 July starting date and low public awareness of the program.

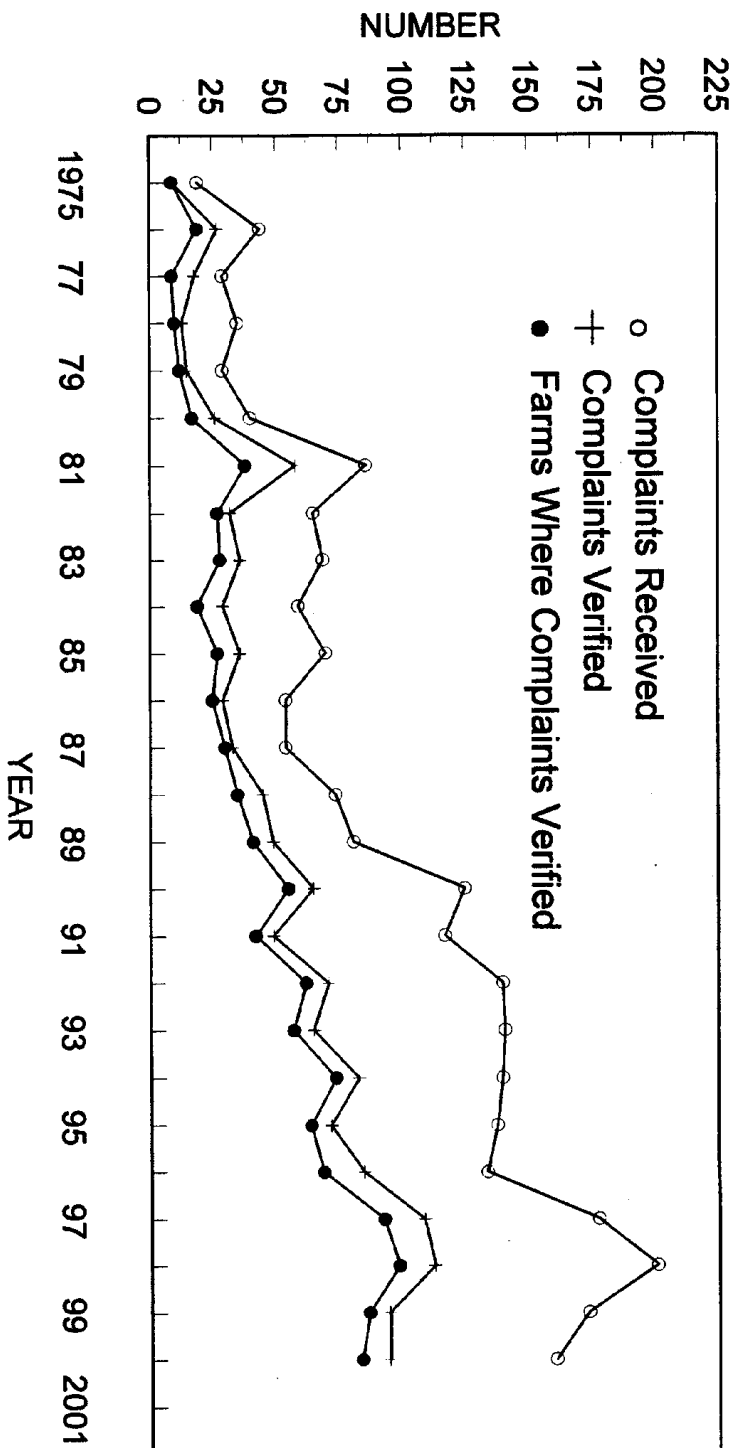
<sup>b</sup> About 35 of these calves were only missing: no remains were found, nor was there evidence that they had been killed by wolves even though wolves may have been near the farm.

<sup>c</sup> During 1998, the State Legislature increased the maximum compensation payment per animal from \$400 to \$750 which contributed to a higher amount of compensation being paid in 1998 and subsequent years.



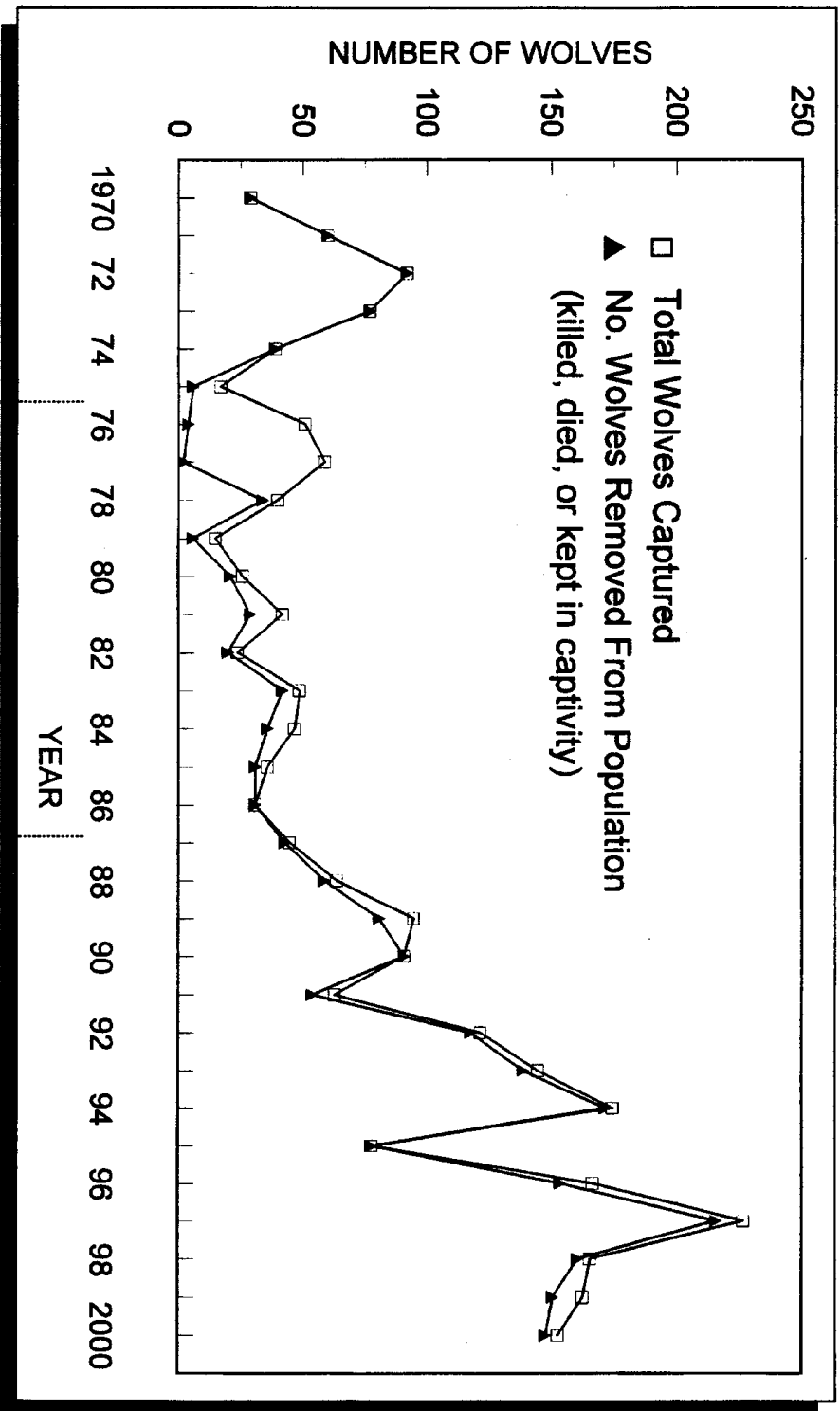
# APPENDIX D

## INDICES TO WOLF-LIVESTOCK DEPREDAATION



Indices to recent wolf depredations on livestock in Minnesota based on reports received by the U.S. Fish and Wildlife Service (FWS) from 1975 through 1985 and the U.S. Department of Agriculture (USDA) from 1986 through 2000. Minnesota Department of Agriculture data are not included. Total number of complaints received are all complaints received involving wolves and livestock, regardless of whether wolves killed a livestock individual. Number of complaints verified are the number of instances in which FWS or USDA investigation of a complaint produced evidence that wolves had killed or injured livestock. Each year after 1975 more than one complaint was verified at some farms. In 1975 the FWS had only a minor program (two trappers and no publicity), but enlarged its staff and publicity in 1976.

# WOLVES CAPTURED AND/OR REMOVED



Total number of wolves captured and number removed from the population by livestock-depredation control programs in Minnesota, 1970-2000. All wolves captured on the Minnesota directed control program were killed. Data for 1970-74 represent State fiscal years. Four wolves captured in late summer 1974 are included in fiscal year 1974. Data for 1975-2000 represent calendar years.

## APPENDIX E

50 CFR 17.5(c)(Cont.)

### ENDANGERED WILDLIFE

50 CFR 17.21(c)(5)

SOURCE: 40 FR 44415, Sept. 26, 1975.

#### § 17.6 State cooperative agreements. [Reserved]

[NO TEXT IN ORIGINAL] SOURCE: 40 FR 44415, Sept. 26, 1975.

#### § 17.7 Raptor exemption.

(a) The prohibitions found in §§ 17.21 and 17.31 do not apply to any raptor [a live migratory bird of the Order Falconiformes or the Order Strigiformes, other than a bald eagle (*Haliaeetus leucocephalus*) or a golden eagle (*Aquila chrysaetos*)] legally held in captivity or in a controlled environment on November 10, 1978, or to any of its progeny, which is:

(1) Possessed and banded in compliance with the terms of a valid permit issued under part 21 of this chapter; and

(2) Identified in the earliest applicable annual report required to be filed by a permittee under part 21 of this chapter as in a permittee's possession on November 10, 1978, or as the progeny of such a raptor.

(b) This section does not apply to any raptor intentionally returned to the wild.

SOURCE: [48 FR 31607, July 8, 1983]

#### SUBPART B – LISTS

##### § 17.11 Endangered and threatened wildlife.

See yellow insert at end of Part 17.

##### § 17.12 Endangered and threatened plants.

See yellow insert at end of Part 17.

#### SUBPART C – ENDANGERED WILDLIFE

##### § 17.21 Prohibitions.

(a) Except as provided in Subpart A of this part, or under permits issued pursuant to § 17.22 or § 17.23, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit or to cause to be committed, any of the acts described in paragraphs (b) through (f) of this section in regard to any endangered wildlife.

(b) Import or export. It is unlawful to import or to export any endangered wildlife. Any shipment in transit through

the United States is an importation and an exportation, whether or not it has entered the country for customs purposes.

##### (c) Take.

(1) It is unlawful to take endangered wildlife within the United States, within the territorial sea of the United States, or upon the high seas. The high seas shall be all waters seaward of the territorial sea of the United States, except waters officially recognized by the United States as the territorial sea of another country, under international law.

(2) Notwithstanding paragraph (c)(1) of this section, any person may take endangered wildlife in defense of his own life or the lives of others.

(3) Notwithstanding paragraph (c)(1) of this section, any employee or agent of the Service, any other Federal land management agency, the National Marine Fisheries Service, or a State conservation agency, who is designated by his agency for such purposes, may, when acting in the course of his official duties, take endangered wildlife without a permit if such action is necessary to:

(i) Aid a sick, injured or orphaned specimen; or

(ii) Dispose of a dead specimen; or

(iii) Salvage a dead specimen which may be useful for scientific study; or

(iv) Remove specimens which constitute a demonstrable but nonimmediate threat to human safety, provided that the taking is done in a humane manner, the taking may involve killing or injuring only if it has not been reasonably possible to eliminate such threat by live-capturing and releasing the specimen unharmed, in a remote area.

(4) Any taking pursuant to paragraphs (c) (2) and (3) of this section must be reported in writing to the U.S. Fish and Wildlife Service, Division of Law Enforcement, P.O. Box 19183, Washington, DC 20036, within 5 days. The specimen may only be retained, disposed of, or salvaged in accordance with directions from Service.

(5) Notwithstanding paragraph (c)(1) of this section, any qualified employee or agent of a State Conservation Agency which is a party to a Cooperative Agreement with the Service in accordance with section 6(c) of the Act, who is designated by his agency for such purposes, may, when acting in the course of his official duties take

## APPENDIX E

50 CFR 17.21(c)(5)(Cont.)

### ENDANGERED WILDLIFE

50 CFR 17.21(g)(2)

those endangered species which are covered by an approved cooperative agreement for conservation programs in accordance with the Cooperative Agreement, provided that such taking is not reasonably anticipated to result in:

- (i) The death or permanent disabling of the specimen;
  - (ii) The removal of the specimen from the State where the taking occurred;
  - (iii) The introduction of the specimen so taken, or of any progeny derived from such a specimen, into an area beyond the historical range of the species; or
  - (iv) The holding of the specimen in captivity for a period of more than 45 consecutive days.
- (d) Possession and other acts with unlawfully taken wildlife.

(1) It is unlawful to possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any endangered wildlife which was taken in violation of paragraph (c) of this section.

Example. A person captures a whooping crane in Texas and gives it to a second person, who puts it in a closed van and drives thirty miles, to another location in Texas. The second person then gives the whooping crane to a third person, who is apprehended with the bird in his possession. All three have violated the law -- the first by illegally taking the whooping crane; the second by transporting an illegally taken whooping crane; and the third by possessing an illegally taken whooping crane.

(2) Notwithstanding paragraph (d)(1) of this section, Federal and State law enforcement officers may possess, deliver, carry, transport or ship any endangered wildlife taken in violation of the Act as necessary in performing their official duties.

(e) Interstate or foreign commerce. It is unlawful to deliver, receive, carry transport, or ship in interstate or foreign commerce, by any means whatsoever, and in the course of a commercial activity, any endangered wildlife.

(f) Sale or offer for sale.

(1) It is unlawful to sell or to offer for sale in interstate or foreign commerce any endangered wildlife.

(2) An advertisement for the sale of endangered wildlife which carries a warning to the effect that no sale may be consummated until a permit has been obtained from the

U.S. Fish and Wildlife Service shall not be considered an offer for sale within the meaning of this section.

(g) Captive-bred wildlife.

(1) Notwithstanding paragraphs (b), (c), (e) and (f) of this section, any person may take; import or export; deliver, receive, carry, transport or ship in interstate or foreign commerce, in the course of a commercial activity; or sell or offer for sale in interstate or foreign commerce any endangered wildlife that is bred in captivity in the United States provided the following conditions are met:

(i) The wildlife is a species having a natural geographic distribution not including any part of the United States, or the wildlife is a species that the Director has determined to be eligible in accordance with paragraph (g)(5) of this section;

(ii) The purpose of such activity is to enhance the propagation or survival of the affected species;

(iii) Such activity does not involve interstate or foreign commerce, in the course of a commercial activity, with respect to non-living wildlife;

(iv) Each specimen of wildlife to be imported is uniquely identified by a band, tattoo or other means that was reported in writing to an official of the Service at a port of export prior to export from the United States, and

(v) Any person subject to the jurisdiction of the United States who engages in any of the activities authorized by this paragraph does so in accordance with paragraphs (g) (2), (3) and (4) of this section.

(2) Any person subject to the jurisdiction of the United States seeking to engage in any of the activities authorized by this paragraph must first register with the Service (Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, DC 20240). Requests for registration must be submitted on an official application form (Form 3-200) provided by the Service, and must include the following information:

(i) The types of wildlife sought to be covered by the registration, identified by common and scientific name to the taxonomic level of family, genus or species;

(ii) A description of the applicant's experience in maintaining and propagating the types of wildlife sought to be covered by the registration, or in

## APPENDIX E

50 CFR 17.40(d)(1)(Cont.)

ENDANGERED WILDLIFE

50 CFR 17.40(d)(2)

junction with a gravel road (un-numbered County District Road) on the north side of Section 31, Township 158 North, Range 30 West; thence east on said District Road to the junction with SFR 62; thence easterly on SFR 62 to the junction with SFR 175; thence south on SFR 175 to the junction with County Route 101; thence easterly on County Route 101 to the junction with County Route 11; thence easterly on County Route 11 to the junction with State Highway 11; thence easterly on State Highway 11 to the junction with State Highway 65, the point of beginning.

### Zone 4--20,883 Square Miles

Excluding Zones 1, 2 and 3, all that part of Minnesota north and east of a line beginning on State Trunk Highway 48 at the eastern boundary of the state; thence westerly along Highway 48 to Interstate Highway 35; thence northerly on I-35 to State Highway 23, thence west one-half mile on Highway 23 to State Trunk Highway 18; thence westerly along Highway 18 to State Trunk Highway 65, thence northerly on Highway 65 to State Trunk Highway 210; thence westerly along Highway 210 to State Trunk Highway 6; thence northerly on State Trunk Highway 6 to Emily; thence westerly along County State Aid Highway (CSAH) 1, Crow Wing County, to CSAH 2, Cass County; thence westerly along CSAH 2 to Pine River; thence northwesterly along State Trunk Highway 371 to Backus; thence westerly along State Trunk Highway 87 to U.S. Highway 71; thence northerly along U.S. 71 to State Trunk Highway 200; thence northwesterly along Highway 200, to County State Aid Highway (CSAH) 2, Clearwater County; thence northerly along CSAH 2 to Shevlin; thence along U.S. Highway 2 to Bagley; thence northerly along State Trunk Highway 92 to Gully; thence northerly along CSAH 2, Polk County, to CSAH 27, Pennington County; thence along CSAH 27 to State Trunk Highway 1; thence easterly on Highway 1 to CSAH 28, Pennington County; thence northerly along CSAH 28 to CSAH 54, Marshall County; thence northerly along CSAH 54 to Grygla; thence west and northerly along Highway 89 to Roseau; thence northerly along State Trunk Highway 310 to the Canadian border.

### Zone 5--54,603 Square Miles

All that part of Minnesota south and west of the line described as the south and west border of Zone 4.

<<See original for Illustration>>

(2) Prohibitions. The following prohibitions apply to the gray wolf in Minnesota.

(i) Taking. Except as provided in this paragraph (d)(2)(i) of this section, no person may take a gray wolf in Minnesota.

(A) Any person may take a gray wolf in Minnesota in defense of his own life or the lives of others.

(B) Any employee or agent of the Service, any other Federal land management agency, or the Minnesota Department of Natural Resources, who is designated by his/her agency for such purposes, may, when acting in the course of his/her official duties, take a gray wolf in Minnesota without a permit if such action is necessary to:

- (1) Aid a sick, injured or orphaned specimen; or
- (2) Dispose of a dead specimen; or
- (3) Salvage a dead specimen which may be useful for scientific study.
- (4) Designated employees or agents of the Service or the Minnesota Department of Natural Resources may take a gray wolf without a permit in Minnesota, in zones 2, 3, 4, and 5, as delineated in paragraph (d)(1) of this section, in response to depredations by a gray wolf on lawfully present domestic animals: Provided, that such taking must occur within one-half mile of the place where such depredation occurred and must be performed in a humane manner: And provided further, that any young of the year taken on or before August 1 of that year must be released.

(C) Any employee or agent of the Service or the Minnesota Department of Natural Resources, when operating under a Cooperative Agreement with the Service signed in accordance with section 6(c) of the Endangered Species Act of 1973, who is designated by the Service or the Minnesota Department of Natural Resources for such purposes, may, when acting in the course of his or her official duties, take a gray wolf in Minnesota to carry out scientific research or conservation programs.

(ii) Export and commercial transactions. Except as may be authorized by a permit issued under § 17.32, no person may sell or offer for sale in interstate commerce, import or export, or in the course of a commercial activity transport, ship, carry, deliver, or receive any Minnesota gray wolf.

(iii) Unlawfully taken wolves. No person may possess,

## APPENDIX E

50 CFR 17.40(d)(2)(Cont.)

ENDANGERED WILDLIFE

50 CFR 17.40(f)(1)

sell, deliver, carry, transport, or ship, by any means whatsoever, a gray wolf taken unlawfully in Minnesota, except that an employee or agent of the Service, or any other Federal land management agency, or the Minnesota Department of Natural Resources, who is designated by his/her agency for such purposes, may, when acting in the course of his official duties, possess, deliver, carry, transport, or ship a gray wolf taken unlawfully in Minnesota.

(3) Permits. All permits available under § 17.32 (General Permits--Threatened Wildlife) are available with regard to the gray wolf in Minnesota. All the terms and provisions of § 17.32 apply to such permits issued under the authority of this paragraph (d)(3).

(e) African elephant (*Loxodonta africana*)--

(1) Definitions. For the purposes of this paragraph (e):

(i) African elephant shall mean any member of the species *Loxodonta africana*, whether live or dead, and any part or product thereof.

(ii) Raw ivory means any African elephant tusk, and any piece thereof, the surface of which, polished or unpolished, is unaltered or minimally carved.

(iii) Worked ivory means any African elephant tusk, and any piece thereof, which is not raw ivory.

(iv) Lip mark area means that area of a whole African elephant tusk where the tusk emerges from the skull and which is usually denoted by a prominent ring of staining on the tusk in its natural state.

(2) Prohibitions. Except as provided in the exceptions in paragraph (e)(3) of this section, it shall be unlawful for any person to:

- (i) Import or export any African elephant,
- (ii) Possess, sell or offer for sale, receive, deliver, transport ship, or export any African elephant which was illegally imported into the United States,
- (iii) Sell or offer for sale any sport-hunted trophy imported into the United States in violation of permit conditions.

(3) Exceptions.

(i) African elephants, other than sport-hunted trophies and raw and worked ivory, may be imported or

exported provided all permit requirements of 50 CFR parts 13 and 23 have been complied with.

(ii) Ivory.

(A) Raw or worked ivory (other than sport-hunted trophies) may be imported only if:

(1) it is a bona fide antique of greater than 100 years of age on the day of import, or

(2) It was exported from the United States after being registered with the U.S. Fish and Wildlife Service.

(B) Worked ivory may be exported in accordance with the permit requirements of 50 CFR parts 13 and 23.

(C) Raw ivory may not be exported from the United States for commercial purposes under any circumstances.

(iii) Sport-hunted trophies may be imported into the United States provided:

(A) The trophy originates in a country for which the Service has received notice of that country's African elephant ivory quota for the year of export;

(B) All of the permit requirements of 50 CFR parts 13 and 23 have been complied with;

(C) A determination is made that the killing of the animal whose trophy is intended for import would enhance survival of the species; and

(D) The trophy is legibly marked by means of punch-dies, under a marking and registration system established by the country of origin, that includes the following information: Country of origin represented by the two-letter code established by the International Organization for Standardization (see appendix A to chapter I) followed by the registration number assigned to the last two digits of the year of registration and the weight of raw ivory to the nearest kilogram. Any mark must be placed on the lip mark area and indicated by a flash of color which serves as a background for such mark.

(f) Leopard.

(1) Except as noted in paragraph (f)(2) of this section, all prohibitions of § 17.31 of this part and exemptions of §

APPENDIX E



IN REPLY REFER TO:

FWS/AES-ESO

United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Bishop Henry Whipple Federal Building  
1 Federal Drive  
Fort Snelling, MN 55111-4056

AUTHORIZATION TO USE REGION 3 ENDANGERED AND THREATENED SPECIES PERMIT  
TO CARRY OUT THE FOLLOWING ACTIVITIES WITHIN THE STATE(S) OF  
MINNESOTA

SUBPERMIT NO.

02-01

ISSUED January 1, 2002

EXPIRES December 31, 2002

INDIVIDUALS COVERED BY THIS SUBPERMIT:

District Supervisor, APHIS - Wildlife Services and designated APHIS employees while performing their official duties.

SPECIES COVERED BY THIS SUBPERMIT:

Gray Wolf *Canis lupus*

In accordance with Federal Endangered Species Permit PRT-697830, you are authorized to conduct the following take activities on the above species for scientific research, enhancement of propagation, or enhancement of survival. Any activity related to Federally listed threatened or endangered species that is not specifically permitted in this document is prohibited.

The activities allowed under this subpermit and the conditions under which those activities must be conducted, are as follows:

Wolves may be taken in accordance with regulations in 50 CFR 17.40(d)(2)(i)(B)(4). Verification of wolf depredation must precede initiation of trapping, and all Wildlife Services employees must be trained by William J. Paul prior to trapping. Wolves, or wolf parts, so taken may be transferred to Native Americans for religious and/or cultural purposes, public educational use, or scientific research purposes. A copy of this subpermit, or a letter of authorization from this office, must be retained with all specimens so transferred. To support FWS Tribal Trust Responsibilities (e.g. Secretarial Order Number 3206), half of all salvaged wolf carcasses shall be made available to Native Americans for cultural and religious purposes on a priority basis. Any wolves taken on tribal property shall be made available to Tribal Chairs prior to any other written request. All requests for carcasses must be made in writing. Specimens not suitable, or not needed, for such use must be destroyed.

Carcasses of all wolves trapped and killed east of Interstate Highway 35 shall be made available to the Wisconsin Department of Natural Resources for necropsy at the USGS - Biological Resources Division's Madison Wildlife Health Laboratory.

A copy of PRT-697830 is attached, and you are required to adhere to the conditions of that permit. This subpermit and PRT-697830 must be in your possession while conducting any authorized activities. You are reminded that necessary state and/or local permits and a U.S. Fish and Wildlife Service bird banding permit, if applicable, must also be acquired and observed; this subpermit is invalid without such permits. This subpermit does not, either directly or by implication, allow or grant right of trespass. All specimens obtained under this subpermit remain the property of the United States Government and must be clearly identified as such.

## APPENDIX E

### REPORTING REQUIREMENTS

Annual and final reporting requirements for activities conducted under the authority of this subpermit, as well as copies of all data obtained from those activities, are due as described below. In addition, copies of all reports and publications resulting from those data must be submitted to this office as they become available. Failure to furnish any reports that are required by this subpermit is cause for subpermit revocation and/or denial of future permit or subpermit applications.

A report of your activities is due on January 31, 2003. Your report must include the dates, locations, approximate age, sex, and number of wolves taken in response to each verified depredation report; locations of depredation complaints in Zone 1, whether verified or not; and the disposition of all wolves, or wolf parts, taken under this subpermit. The disposition report shall include a list of wolves transferred for religious, cultural, educational, or scientific purposes, including the institution or individual to whom the wolf or wolf part(s) were transferred, the address of that institution or individual, and the date(s) of transfer. Copies of all written requests received for wolf carcasses shall also accompany the annual report. Location information must identify range and township or must be shown on an appropriate map.


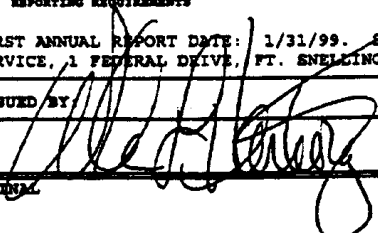
All correspondence related to this subpermit should reference the subpermit number shown above. Any questions you may have regarding this subpermit should be directed to the Region 3 Endangered Species Permits Biologist at (612) 713-5343.

  
TJ Miller, Program Manager,  
Ecological Services, Habitat Conservation

cc: FWS/ES Endangered Species Coordinator for Minnesota  
DNR/DOC Endangered Species Coordinator for Minnesota



# APPENDIX E

DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE		3-201 (10/86)	
		2. AUTHORITY-STATUTES 16 USC 1539 (a) 16 USC 1533 (d)	
FEDERAL FISH AND WILDLIFE PERMIT		REGULATIONS (attached) 50 CFR 17.22 50 CFR 17.32	
1. PERMITTEE  FISH & WILDLIFE SERVICE, REGION 3 ASSISTANT REGIONAL DIRECTOR 1 FEDERAL DRIVE FT. SNELLING, MN 55111-4056		3. NUMBER PRT-697830 A2	
4. RENEWABLE YES NO		5. MAY COPY YES NO	
6. EFFECTIVE 03/07/98		7. EXPIRES 03/07/03	
8. NAME AND TITLE OF PRINCIPAL OFFICER (if # 1 is a business) ASSISTANT REGIONAL DIRECTOR		9. TYPE OF PERMIT ENDANGERED/THREATENED SPECIES	
10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED REGION 3			
11. CONDITIONS AND AUTHORIZATIONS. A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS. B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW. C. VALID FOR USE BY PERMITTEE NAMED ABOVE.  XX ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY - PAGE 1 of 4 PAGES			
12. REPORTING REQUIREMENTS FIRST ANNUAL REPORT DATE: 1/31/99. SUBMIT COMPLETE REPORT TO: REGIONAL DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, 1 FEDERAL DRIVE, FT. SNELLING, MN 55111-4056, BY 1/31 FOLLOWING EACH YEAR PERMIT IS IN EFFECT.			
ISSUED BY 		TITLE REGIONAL DIRECTOR, FWS, REGION 3	
DATE 3/11/98			

ORIGINAL

## APPENDIX E

REGIONAL BLANKET ENDANGERED SPECIES PERMIT  
REGION 3  
PRT-697830 A2

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- D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS. SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.
- E. AUTHORIZED TO TAKE LISTED SPECIES IDENTIFIED ON THE ATTACHED SHEETS FOR SCIENTIFIC PURPOSES OR THE ENHANCEMENT OF PROPAGATION OR SURVIVAL FOR APPROVED RECOVERY ACTIVITIES AND AS CONDITIONED BELOW.
- F. PRIOR TO CONDUCTING ANY ACTIVITIES NOT EXCLUDED UNDER THE SERVICE'S NEPA CATEGORICAL EXCLUSIONS (516 DM 6, APPENDIX I), THE PERMITTEE MUST ENSURE THAT ALL NEPA REQUIREMENTS HAVE BEEN SATISFIED.
- G. PERMITTEE MUST MONITOR EACH ACTION TAKEN UNDER THIS PERMIT TO ASSURE THAT THE LIMITS SPECIFIED IN EACH SUBPERMIT ARE NOT EXCEEDED AND THAT RESEARCH EFFORTS AND HANDLING OF INDIVIDUAL SPECIES IS NOT DUPLICATED BY OVERLAPPING RESEARCH.
- H. THIS PERMIT IS CONDITIONED UPON ALL APPLICABLE POLICY AND GUIDANCE.
- I. SUBPERMITTEES MUST BE DESIGNATED IN WRITING.
- J. SUBPERMITTEES MUST BE REQUIRED TO HOLD AND TRANSPORT LIVING SPECIMENS CAPTURED IN THE WILD ACCORDING TO THE PROVISIONS AND PROCEDURES OUTLINED IN PROFESSIONALLY ESTABLISHED PROTOCOLS FOR THE HANDLING AND TRANSPORT OF THE AFFECTED SPECIES.
- K. PROCEDURES WILL BE INSTITUTED TO ENSURE THAT DISEASE TRANSMISSION DOES NOT OCCUR DURING TISSUE SAMPLING OR OTHER INVASIVE PROCEDURES AND THAT SUCH ACTIVITIES ARE ONLY PERFORMED BY PERSONS SKILLED IN THE TECHNIQUES OF HANDLING THE AFFECTED SPECIES.
- L. THE PERMITTEE MUST ENSURE THAT ALL APPROPRIATE SECTION 7 CONSULTATION REQUIREMENTS HAVE BEEN COMPLETED PRIOR TO INITIATING ANY OTHERWISE PERMITTED ACTIVITIES AND THAT NO ACTION TAKEN UNDER THIS PERMIT WILL VIOLATE SUBSECTION 7(a)(2) OF THE U.S. ENDANGERED SPECIES ACT.

## APPENDIX E

REGIONAL BLANKET ENDANGERED SPECIES PERMIT  
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### SPECIES LIST

#### MAMMALS

Bat, gray  
Bat, Indiana  
Bat, Ozark big-eared  
Wolf

*Myotis grisescens*  
*Myotis sodalis*  
*Plecotus townsendii ingens*  
*Canis lupus*

#### BIRDS

Eagle, bald  
Falcon, peregrine  
Plover, piping  
Tern, least tern  
Warbler, Kirtland's (wood)

*Haliaeetus leucocephalus*  
*Falco peregrinus*  
*Charadrius melodus*  
*Sterna antillarum*  
*Dendroica kirtlandii*

#### REPTILES

Snake, copperbelly water (northern population)

*Nerodia erythrogaster neglecta*

#### FISH

Cavefish, Ozark  
Darter, Niangua  
Madtom, Scioto  
Madtom, Neosho  
Sturgeon, pallid

*Amblyopsis rosae*  
*Etheostoma nianguae*  
*Noturus trautmani*  
*Noturus placidus*  
*Scaphirhynchus albus*

#### CLAMS

Clubshell  
Fanshell  
Mussel, ring pink (=golf stick pearly)  
Mussel, winged mapleleaf  
Pearlymussel, cracking  
Pearlymussel, Curtis'  
Pearlymussel, Higgins' eye  
Pearlymussel, orange-foot pimple back  
Pearlymussel, pink mucket  
Pearlymussel, purple cat's paw pearly mussel

*Pleurobema clava*  
*Cyprogenia stegaria* (=irrorata)  
*Obovaria retusa*  
*Quadrula fragosa*  
*Hemistena* (=Lastena) lata  
*Epioblasma* (=Dysnomia) florentina curtisi  
*Lampsilis higginsii*  
*Plethobasus cooperianus*  
*Lampsilis abrupta* (=orbiculata)  
*Epioblasma* (=Dysnomia) obliquata  
obliquata (=sulcata sulcata)  
*Epioblasma* (=Dysnomia) torulosa torulosa  
*Epioblasma* (=Dysnomia) turgidula  
*Epioblasma* (=Dysnomia) obliquata  
perobliqua  
*Plethobasus cicatricosus*  
*Pleurobema plenum*  
*Potamilus* (=Proptera) capax  
*Epioblasma torulosa rangiana*

Pearlymussel, tubercled-blossom  
Pearlymussel, turgid-blossom  
Pearlymussel, white cat's paw

Pearlymussel, white wartyback  
Pigtoe, rough  
Pocketbook, fat  
Riffleshell, northern

#### SNAILS

Snail, Iowa Pleistocene

*Discus macclintocki*

#### INSECTS

Beetle, American burying (=giant carrion)  
Beetle, Hungerford's crawling water  
Butterfly, Karner blue  
Butterfly, Mitchell's satyr  
Dragonfly, Hine's (=Ohio) emerald

*Nicrophorus americanus*  
*Brychius hungerfordi*  
*Lycæides melissa samuelis*  
*Neonympha mitchellii mitchellii*  
*Somatochlora hineana*

## APPENDIX E

REGIONAL BLANKET ENDANGERED SPECIES PERMIT  
REGION 3  
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### PLANTS

*Aconitum noveboracense*  
*Apios priceana*  
*Asclepias meadii*  
*Asplenium (=Phyllitis) scolopendrium*  
    (=japonica) var. *americanum*  
*Boltonia decurrens*  
*Cirsium pitcheri*  
*Dalea foliosa* (=Petalostemum f.)  
*Erythronium propullans*  
*Geocarpon minimum*  
*Hymenoxys herbacea* (=acaulis var. *glabra*)  
*Iris lacustris*  
*Isotria medeoloides*  
*Lespedeza leptostachya*  
*Lesquerella filiformis*  
*Lindera melissifolia*  
*Mimulus glabratus* var. *michiganensis*  
*Oxytropis campestris* var. *chartacea*  
*Platanthera leucophaea*  
*Platanthera praeclara*  
*Sedum integrifolium* ssp. *leedyi*  
*Solidago houghtonii*  
*Spiraea virginiana*  
*Trifolium stoloniferum*

northern wild monkshood  
Price's potato-bean  
Mead's milkweed  
American hart's-tongue fern

decurrent false aster  
Pitcher's thistle  
leafy prairie-clover  
Minnesota dwarf trout lily  
no common name  
lakeside daisy  
dwarf lake iris  
small whorled pogonia  
prairie bush-clover  
Missouri bladder-pod  
pondberry  
Michigan monkey-flower  
Fassett's locoweed  
eastern prairie fringed orchid  
western prairie fringed orchid  
Leedy's roseroot  
Houghton's goldenrod  
Virginia spiraea  
running buffalo clover

3/11/98

Date

  
Regional Director

APPENDIX E

STATE OF MINNESOTA  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WILDLIFE  
500 LAFAYETTE ROAD  
ST. PAUL, MINNESOTA 55155-4007

SPECIAL PERMIT NO. 10842  
(Taking for depredation controls/capture  
and release for depredation control)

January 7, 2002

TO WHOM IT MAY CONCERN:

Permission is granted to:

William Paul  
U.S.D.A.  
Animal & Plant Health Inspection Service  
Wildlife Services  
34912 US Hwy 2  
Grand Rapids, MN 55744

to take, or take and release protected birds and mammals in reasonable numbers to alleviate animal damage problems. Other Wildlife Services' employees may, under supervision and direction of the permittee in his capacity as District Supervisor, execute provisions of this permit provided they have in their possession a copy of this permit and a letter of authorization from the permittee. Permittee must obtain applicable Federal permits.

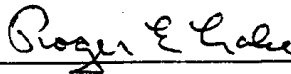
State hunting and trapping regulations do not apply provided that permittee is in full compliance with Federal laws, rules and regulations.

State endangered or threatened species may be taken only under authority of additional permits.

A report shall be submitted to the DNR's Division of Wildlife (Division of Wildlife, Box 7, 500 Lafayette Road, St. Paul, MN 55155 Attn: Permits) by January 31, 2003 showing the number of each species taken and/or released under this permit during 2002 respectively.

This permit is valid from date of issuance through December 31, 2002, but may be revoked at any time.

ROGER LAKE, ASSISTANT SUPERVISOR  
WILDLIFE POPULATIONS AND RESEARCH UNIT,  
DIVISION OF WILDLIFE



cc: Division of Enforcement  
Craig Backer, Regional Enforcement Supervisor  
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Mark Johanson, Regional Enforcement Supervisor  
Perry Bollum, Regional Enforcement Supervisor  
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Ken Varland, Regional Wildlife Manager  
Jack Heather, Regional Wildlife Manager  
Roger Johnson, Regional Wildlife Manager  
Con Christianson, Furbearer/Wildlife Depredation Specialist

APPENDIX F

**RECOVERY PLAN  
FOR THE  
EASTERN TIMBER WOLF**

**Revised 1992**

**Original Recovery Plan Approved June 5, 1978**

**Prepared by the Eastern Timber Wolf Recovery Team  
for  
Region 3, U.S. Fish and Wildlife Service  
Twin Cities, Minnesota**

**Approved:**

  
**Regional Director, U.S. Fish and Wildlife Service**

**Date:**

**JAN 8 1 1992**

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EASTERN TIMBER WOLF

RECOVERY PLAN

### ACKNOWLEDGEMENTS

The U.S. Fish and Wildlife Service gratefully acknowledges the efforts of the many individuals that have contributed their energy and time - official as well as personal - to the preparation of this recovery plan. We especially extend our appreciation to the current recovery team members, as well as former team members William Hickling, LeRoy Rutske, and Robert Linn, and recovery team consultants Tom Weise and John Mathisen. Ron Refsnider, staff biologist in the Endangered Species Division, Twin Cities, Minnesota, was instrumental in getting this recovery plan revised and finalized. Many other individuals have also assisted in this effort and we sincerely thank them all for their various contributions.

This document should be cited as follows:

U.S. Fish and Wildlife Service. 1992. *Recovery Plan for the Eastern Timber Wolf*. Twin Cities, Minnesota. 73 pp.

Additional copies may be purchased from:

Fish and Wildlife Reference Service  
5430 Grosvenor Lane, Suite 110  
Bethesda, Maryland 20814  
301-492-2603 or 1-800-582-3421

The fee for a recovery plan varies depending upon the number of pages in the plan.

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### EASTERN TIMBER WOLF

#### RECOVERY PLAN

### SUMMARY

**Current Status:** The eastern timber wolf is a subspecies of the gray wolf and is listed as threatened in Minnesota and endangered throughout the remainder of its historic range in the eastern United States. A stable and growing population estimated at 1550 to 1750 wolves currently exists in Minnesota. Approximately 45 to 60 wolves comprise a second population in northern Wisconsin and the Upper Peninsula of Michigan. An additional thirteen or fourteen wolves are located in Isle Royale National Park, Michigan.

**Habitat Requirements and Limiting Factors:** This subspecies cannot survive over the long term without (1) large tracts of wild land with low human densities and minimal accessibility by humans, and (2) the availability of adequate wild prey, largely ungulates and beaver. Currently, it is believed that there exists sufficient suitable habitat in Minnesota, Wisconsin, and Michigan to achieve the recovery criteria.

**Recovery Objective:** Delisting.

**Recovery Criteria:** At least two viable populations within the 48 United States satisfying the following conditions must exist: (1) the Minnesota population must be stable or growing, and its continued survival be assured, and (2) a second population outside of Minnesota and Isle Royale must be re-established, having at least 100 wolves in late winter if located within 100 miles of the Minnesota wolf population, or having at least 200 wolves if located beyond that distance. These population levels must be maintained for five consecutive years before delisting can occur. A Wisconsin-Michigan population of 100 wolves is considered to be a viable second population, because continued immigration of Minnesota wolves will supplement it demographically and genetically for the foreseeable future.

**Reclassification Criterion:** The Wisconsin wolf population should be reclassified to threatened status when the late-winter Wisconsin population is maintained at 80 wolves for three consecutive years. Reclassifying Michigan wolves also may be considered at that time.



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### EASTERN TIMBER WOLF

#### RECOVERY PLAN

#### Summary of Major Changes in this Revision:

1. The Plan describes the characteristics of a "viable population" of wolves at two levels of geographic isolation from the Minnesota population. (These characteristics were absent from the original 1978 Plan, but were added to it in 1981.) The Plan also specifies that populations must exhibit these characteristics for at least five consecutive years to be considered viable.
2. A Wisconsin wolf population of 80 or more for three successive years will allow reclassification to "threatened" in Wisconsin, and possible reclassification in Michigan.
3. The importance of minimizing roads open to the public within wolf habitat is described and quantified in a "road density statement."
4. The Plan recommends changes to the wolf depredation control program in Minnesota to allow non-lethal control of depredating wolves in Zone 1, and more timely action at sites of repeated depredations in Zones 4 and 5.
5. Several changes to the Minnesota Wolf Management Zone boundaries are recommended to improve the original delineations. These recommendations stem from better information on habitat conditions and wolf numbers in portions of Zones 3, 4, and 5, and from the previous unwarranted inclusion of several communities and built-up areas within Zone 1.
6. Areas in the southern and central Appalachian Mountains are no longer being considered for future eastern timber wolf reintroduction.
7. The list of factors that are critical threats to the long-term survival of the eastern timber wolf has been expanded to include diseases and parasites.

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EASTERN TIMBER WOLF

RECOVERY PLAN

### Summary of Major Actions Needed:

1. Increase public education programs on wolf restoration.
2. Monitor wolf populations, habitat conditions, and prey base.
3. Maintain suitable habitat conditions and prey populations throughout recovery areas.
4. Provide concerted law enforcement activities.
5. Minimize losses of domestic animals due to wolf predation.
6. Evaluate need and feasibility of restoring wolves to Maine-New Hampshire and/or New York.

Total Estimated Cost of Recovery: \$13,500,000

Estimated Date of Recovery: 2005

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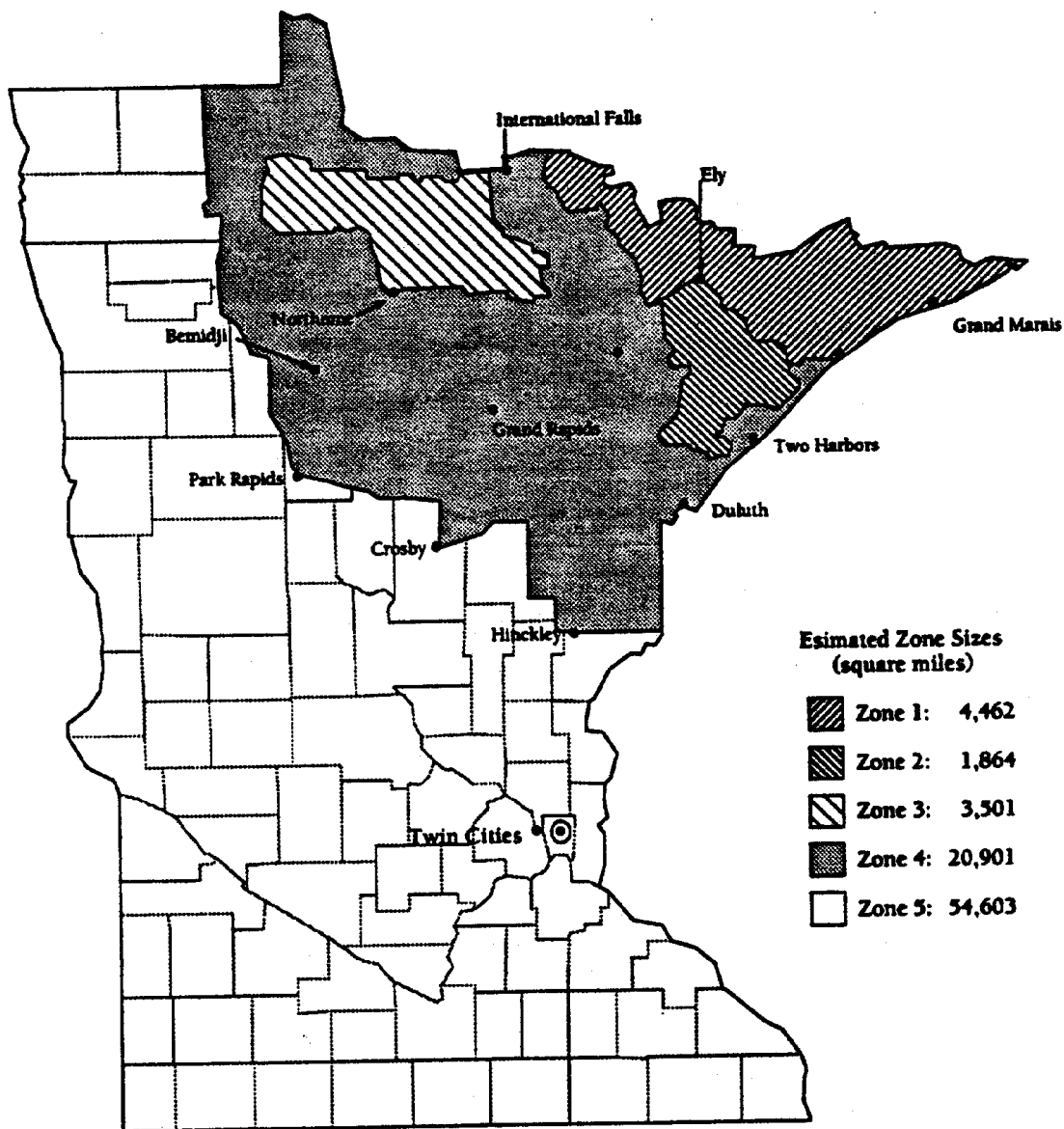
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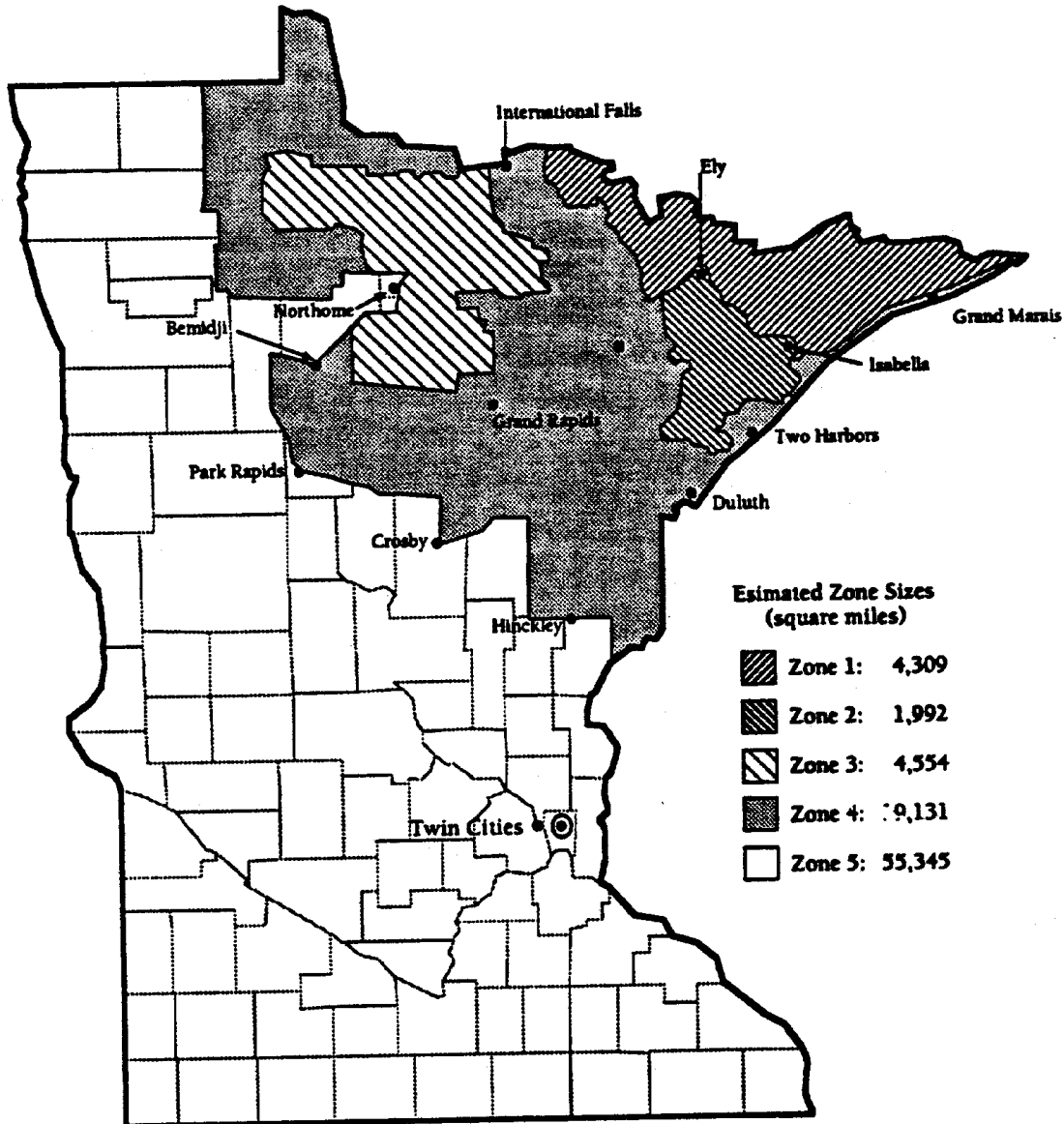


Current Wolf Management Zones

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**Proposed Wolf Management Zones**